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"Salvation of India lies in Cottages."

—*MAHATMA GANDHI*

SAVING THE CORE OF THE PLAN

WITH the deepening of Economic Crisis in the country and the difficulty of obtaining adequate financial aid from foreign sources, the Government and the Planning Commission are faced with the problem to prune, re-phase and re-arrange the priorities of the Second Plan to save its core. In the course of the debate on the Plan in the Lok Sabha, the core of the plan mentioned by Government spokesmen, was to fulfil the plan-targets in respect of transport, power, mining and industry with a view to build industrial base of our economy mainly aimed at by the Second Plan.

But the shortage of food and the rising index of food prices have upset previous calculations of the plan and the Government have had to assign top-priority to the programme of food production and making the country self-sufficient in food, which, they had mistakenly thought as having been already achieved by the first plan. This realisation seems to have shifted the emphasis of the plan from industrial to agricultural basis once again which is yet weak and needs to be strengthened.

This shift of emphasis from industrial to agricultural bias has been necessitated due to economic crisis, the country is passing through, which has been explained by the Finance Minister, Shri T. T. Krishnamachari, in the course of a recent article on India's 'Current Economic Situation' published by him in 'Economic Review'—the organ of the All India Congress Committee :—

"The Second Plan is, recognisedly a more difficult plan, and even in its initial phase it has caused a considerable strain on the economy. Prices have risen steadily over the last two years and foreign exchange reserves have declined sharply. The upward trend in prices-upto a point-was a correction of the earlier fall, but it has now gone a bit too far by some 10 percent or so. The balance of payment position has also deteriorated. The foreign assets of the Reserve Bank which were declining roughly at the rate of Rs. 5 crores per week during 1956 have been declining at the rate of Rs. 8 to 9 crores per week during the last three months (May to July 1957). The general index of wholesale prices which increased by 8 percent in 1956-57 has risen by another 5 percent during the last four months (April-July 1957)".

The strain on the country's economy must inevitably affect the progress of the plan necessitating pruning and re-arrangement of priorities regarding which, while replying to the debate in the Rajya Sabha the Finance Minister is reported to have stated :—

"There was no doubt, the plan was running through a difficult phase and the next year or two would be crucial not only for the Second Plan as such but for the process of all-round development of the country. But he saw no reason to be disheartened by the present difficulties. Every country had to face such difficulties in one form or the other. The process of rapid development involved sacrifices and in the earlier stages was bound to meet with difficulties."

"I, on my part, am confident that the people of our country are capable of putting up the degree of sacrifice and self-denial requisite for a sizable development effort. I should also add that while we rephase the plan and prune it, we should adhere to the basic goals, objectives and approaches of the plan."

In the course of the same reply, the Finance Minister, has emphasised the need of increased food production and said :—

"Food was the main basis and foundation of the plan." On that could be built the superstructure of the plan whose hard core was the steel, coal transport and power projects. The superstructure could be pruned or built upon only if the foundation was there. In the rephasing of the plan some of the power projects of lesser priority might be postponed".

Food Production Once Again

Increased food production thus holds top-priority during the Second Plan-period. Lately, while addressing the staff of the Central Food Technological Research Institute in Mysore, the Prime Minister, expressed his complete confidence to increase food production by 30 or 40 percent in the next five years and said :—

"We are not going to take 30 years to achieve a 30 percent increase in food production. We are going to do it in five years' time. We need not be pessimistic about it".

Coming as they do from the Prime Minister, these are brave words indeed and are entitled to people's attention. But their import needs to be examined by the cold logic of facts before they are made acceptable to enlightended public opinion.

None would be happier than ourselves if the Prime Minister's optimism is corroborated by the facts of the past experiences of the 'Grow more Food Campaign' and the First Five-Year Plan, which had all concentratively aimed at increasing the production of food in the country. If the problem of shortage of food still persists inspite of the very best efforts of the Government and the people during the last 10 years since Independence, it should obviously be accepted as a difficult and complicated problem and is not so easy of solution as the Prime Minister optimistically believes.

There are only three and a half year remaining to complete the Second Plan period. Nothing much could be done to intensify food production campaign during the current year 1957–58 as the sowing season of the Rabi crop is practically drawing to a close in a greater part of the country. If 30 percent of food has to be increased by special efforts of the Government and the people, it implies continuous increase of 10 percent production of food every year during the next three years. Such a possibility, on the very face of it, appears to be rather fantastic and impossible of achievement.

On the basis of the latest estimates, foodgrains production in the last year 1956–57 amounted to 68.6 million tons which was rather a little below the record level of 68.7 million tons reached in 1953–54, three years back. If production of food has practically remained stationary during the last three years, it does not stand to reason how it could be augmented by 30 percent in the next three years, notwithstanding the optimism of the Prime Minister. To increase production of food from 68.6 million tons to about 88 million tons, which 30 percent increase connotes, by the end of March 1961 which is the end of the Second Plan-period,–with all the attendent disadvantages from which Indian agriculture suffers and which had as the experience of the last three years clearly showed remained practically stationary–would be nothing short of a miracle. To increase it even by 10 percent during the operational period of the Second Plan would be a stupendous task and a creditable performance.

Assumptions and Uncertainties.

From the very inception of the first plan, planning in this country has suffered from being based on mere assumptions without much sound factual basis. It has been conceived by political motives and has been used as an instrument for winning elections by the party in power. Colossal wastage of public money that has gone on all these years under the name of planning and development and which drain has been mainly responsible for the present economic crisis in the country was connived at by the ruling party as not too bad a price for their continuance in power. All weaknesses and wastages of the plans—and they have been colossal-were covered up by the announcements of the leaders in power as a matter of no consequence. In short, it has been a political planning rather than economic. For, no purposeful planning can afford to be indifferent to economic wastages and inefficiencies which have been the most pronounced and universally admitted feature of planning in this country.

Inspite of the economic crisis, which is the result of unscientific and unmethodical planning all these years, the planning authorities in this country still persist in their way-ward and baseless assumptions. The planning Minister, Shri Gulzari Lal Nanda, while speaking on the needs of financing the Second Plan in the Lok Sabha once again starts on these assumptions, which, as stated by him, are :—

" These assumptions are that the State will make a substantial tax effort : that the receipts from loans and small savings would, inspite of the present unfavourable trends, come up more or less to the initial expectations ; that deficit financing of the order of Rs. 1000 crores, (as compared to Rs. 1200 crores in the plan), would be feasible, and, finally that external assistance for the plan in the public sector would be available to the extent of Rs. 1000 crores (as compared to Rs. 800 crores in the plan) . It was naturally difficult to say how far these assumptions would be borne out by subsequent developments and by internal and external economic developments".

The most tragic aspect of planning in this country is that these assumptions are made against the background of discouraging past experiences, knowing, that the States have not done all that they can to raise fresh resources : the food production drive has not been as successful as it should have been : the progress of land reforms in the States has been hopelessly slow and unsatisfactory : the Community Development Programme has been a huge waste if not a complete failure and the people's response to public loans and small savings drive during the last two years has been hardly 50 to 60 percent of the targets fixed.

It is no wonder, the Planning Minister himself feels shaky and uncertain about the outcome of these assumptions made against uninspiring background.

Prospects of Foreign Aid

The symptoms of inbalance of the country's economy are obvious with the declining of the foreign asssets of the Reserve Bank by about 350 crores since April 1956, continuous rise of domestic prices particularly of foodgrains for about 2 years and the rising index of the cost of living affecting all classes of people. To bridge the gap of foreign exchange position which has, of late, deteriorated and also to finance the Second Plan, substantial foreign aid to the tune to Rs. 1000 crores, as stated by the Planning Minister in his statement in the Lok Sabha, is needed to save the core of the plan. The Finance Minister is on a mission to U. S. A. and other foreign countries to secure this aid to restore financial equilibrium of the country's economy and to finance the plan. It is yet difficult to forecast as to what extent he succeeds in his difficult mission in

the present international atmosphere surcharged with certain prejudices against this country.

However, U.S.A. is the only country from where huge financial aid of the order of Rs. 1000 crores or near about may be expected. But the warning given by Mr. Robert Anderson, U.S. Secretary of the Treasury, in the course of his speech to the Governors of the World Bank and the delegates of the International Monetary Fund does not hold out bright prospects of the materialisation of this hope from American sources. He is reported to have said :—

"The countries seeking money for industrial development projects must rely increasingly hereafter on private capital rather than on American or other foreign aid. As the economic health of the world improves, private investment would be expected to provide international financing with less dependence on the budgets of any of the countries of the free world."

If the views of the U.S. Secretary of the Treasury may be taken to represent American opinion, the prospects of financial aid from American sources may not be considered as hopeful.

All-round Economy

Looked at from various aspects, the future of the Second Plan appears to be uncertain. The critical economic situation of the country cannot sustain the overload of the Second Plan. The chances of anticipated foreign aid are not promising. The climate in the country is not such as may inspire great hope from domestic sources.

The only way to avert the economic crisis therefore is to prune the plan to the minimum and to effect all-round savings by ruthlessly cutting down overheavy expenditure on administration created in recent years. The economic situation in the country demands this difficult decision from the authorities and the administration would be well advised to effect all-round economy in administration without waiting for foreign aid to fill up the gaps of the Second Plan.

DEMOCRATIC APPROACH TO PLANNING

By: **S. KRISHNA**

PLANNING may be viewed as the synthesis of the national endeavour to improve the standard of living of the people. It in other words is the antithesis of purposeless drifting. Planning in an under—developed country essentially means a concerted programme of development spread over a period of time. In this nation-building task, the Government acts as the central authority responsible for co-ordination and control, and the execution of the development work is apportioned between the various sections of society, including government organisations, individuals and groups, according to the aptitude, capability and capacity of each.

The Human Element in Planning

All sections are expected to co-operate for the achievement of common goal. It is obvious that the Government cannot do everything, and the bulk of the effort would have to be put up by the people engaged in different fields. The Government would take up the responsibility of directly executing certain projects, which no other section of society would be able or willing to take up on a nationwide scale, including projects of education,

medical relief, public works such as roads, canals and multi-purpose river-valley projects, and sections of public utility services like railway, transport and electric-power.

Non-Government organisations may be entrusted with the work best suited to them, particularly in the fields of industry other than defence and trade. Of course Government may regulate, aid and direct their activity in the appropriate manner.

Planning, therefore, needs co-operation of all. In a totalitarian society, the Government can coerce people to act in the required manner. But, in a democratic society, the use of coercive methods would lead to social unrest and jeopardise the success of the Plan. The only way by which planners can enlist popular support for the planning effort in a democratic society such as India is by an appeal to the people's instinct for making their country strong economically.

Though adequacy in materials and money are essential, human resources are by far more important, and play the key role in planning, as in any other human endeavour. Therefore, in a democracy, only a human approach would enthuse the people in offering co-operation.

Ends, Means and Human Values in Planning

From the human point of view, the planners have to consider three fundamental issues. The first is about the ultimate end of planning or the social goal, which in our case is to raise the standard of living of the people. Although there cannot be any major difference of opinion on this issue, there is some confusion between the socialist pattern of society and social welfare as the end of planning policy, as explained below. The second issue is about the choice of means, which are, in our case, socio-economic progress, i. e. increasing national productivity and effecting equitable distribution of wealth. This is where confusion begins and no attempt has so far been made to ward it off. Certain extreme elements tend to over-emphasise the distribution aspect even to the prejudice of the production problem. The third issue is about the human values held as sacrosanct by the people, which should not be violated in the pursuit of progress.

The human approach to planning requires that the ends be consistent with social choice; that the means chosen stand in conformity with the aptitutde, capacity and capability of the people; and that the planning measures are democratic, in the sense that they allow the fullest scope to spontaneity, and are not coercive or inhibitive.

Social Welfare and the Socialist Pattern.

There will be general agreement on the point that 'Social Welfare' is the ultimate end of the social goal of planning. In totalitarian societies, military supremacy or preparedness is a primary goal in view of the almost constant threat of the danger of war or internal revolt. India stands on entirely a different footing. She is not pledged either to support or oppose the capitalist or communist form of economy, but to follow a path which is socially the most advantageous.

All this might seem quite obvious and simple; yet surprisingly enough, we find our Government committing the error of regarding the establishment of the "socialist pattern of society" as a social goal. The socialist pattern of society is not by itself the end of planning; it is the form of social organisation that is expected to emerge as a result of the steps envisaged under the Plan. If we

pursue social welfare in the manner planned, the socialistic pattern of society will ensue, but the converse proposition is far from correct. Social welfare essentially means an increase in the *per capita* national income.

Increase in per capita national income can be effected only by increasing the *national product*, that is, the sum total of the goods and services produced by the nation. This can be done by increasing the country's productive capacity, that is, building more factories, irrigation works, power houses, roads and railways; obtaining adequate supplies of raw materials, fertilizers, machinery and other equipment; extending facilities for training, research and education; persuading workers to work harder, manufacturers and farmers to produce more and enthusing all others to put up their best possible effort.

Since coercive methods used in totalitarian countries are out of question in a democratic society, persuasive methods have to be used. Ordinarily, in helping ourselves, we promote the interest of others. For example, the farmer produces food-stuffs and sells a part of it to the weaver in return for his cloth. This is done through the medium of the market. But, sometimes, individual interest clashes with that of society, as when dealers of foodstuffs charge exorbitant prices. In such conflicts, social benefit should naturally be placed before individual gain.

Individual Incentives

The planners tend to underestimate the importance of individual incentives, particularly fiscal incentives. The aspiration for personal gain is not an evil in itself, and it would be wisdom to allow every individual to pursue his own interest if in doing so he directly or indirectly benefits society, and, in any case, as long as he does not injure social interest. Planners tend to over-emphasise the role of Government organisations and neglect the importance of popular effort.

One of the reasons for this tendency on the part of Government to assume excessive control is the fear entertained by some persons that economic freedom might accentuate economic inequalities. The new tax structure in India is highly progressive to check concentration of wealth in a few hands. It is also argued that economic freedom might result in concentration of economic power in the hands of a few individuals. It should be realised, however, that in any social organisation, some individuals will exercise more power than others, and that if no individual is to be entrusted with any power, the Government will have to wield all the power on behalf of the community. It would be better to distribute economic power among a large number of people rather than concentrate it in the hands of those few who exercise governmental authority. Human nature being what it is, inequalities cannot be avoided though they should be reduced to a socially desirable extent.

Economic Opportunity

The accent should be on equal economic opportunity. This can be done by providing all citizens with the opportunity to educate themselves and to follow trades and professions best suited to their aptitudes. The positive approach to the egalitarian problem is to level up the income of the poor, which can be done by providing appropriate facilities. The negative approach to the problem is to reduce the income of the rich. There can be no objection to such measures in so far as they do not have any adverse effects on national productivity.

The ideal income distribution policy should be to aim at ensuring a minimum income for every person, and allowing

functional income differentials, that is, income differentials, that act as incentives to work and to save.

Planning in a democratic society, therefore, necessarily means planning on lines determined according to the wishes of the people. Spontaneity is the essence of progress in a democratic society, just as regimentation is an essential condition of totalitarian planning. Progress through voluntary effort is democratic; through enforced effort, autocratic. The human approach to democratic planning calls for maximum possible spontaneity and self-reliance, which alone are the principal attributes of a society with a back-bone.

CULTURAL PLANNING IN INDIAN CIVILIZATION

By : **I. N. R. PANDEY**

THERE has been a lot of wishful thinking over the subject during the past decade and writers have tried to throw sufficient light in order to co-relate the past with the present but have landed nowhere. Consequently much remains to be said about this most important and indispensable aspect of developmental activities without which nothing would have its lasting and progressive effect in every walk of life of man.

The glorious culture of India has established its supremacy from times immemorial over the entire globe. It is needless to emphasize that the basis of the present Indian culture has been evolved from that Inconceivable, Infinite and Omnipotent Creater known as God, who, for the sake of reciprocating the love of His devotees had incarnated Himself in the form of mortal beings and to establish peace and happiness on earth. To be able to realize Him, to follow Him, and to attain Him in one's ownself had always been the real object of life of men in India. Hence all social, religious, economic, political and intellectual developments were mainly directed towards that one supreme objective. All planning was done with this supreme idea in mind and consequently there had always been this internal Motive Force behind each and every function of an individual member of society in India.

All costoms, rites and ceremonies in the society were based and directed to to attain the same Spiritual Power which has been controlling the destiny of mankind with its Eternal Force.

Despite several interminglings of other religions which came from outside and influenced the Hindu religion as a result of political upheavals, the Indian society presently consisting of most of the religions of the world has still preserved that conception of God in one form or the other. This conception of God has been unique in almost all the religions of the world and hence the society in India has always based its structure on this firm and all-proof foundation. The individuals who carried this "Divine Light" have always been guided by this Motive Force and consequently they attained their highest moral and social salvation.

Hence it is clear that anything that may shatter this faith of individuals will also upset the structure of Indian society creating chaos and uncertainty in the minds of the people. This faith, acting as it does, as the foundation of the Indian society should not be touched and disturbed in the course of multifarious activities now being carried on under the community development programme.

The modern ara has dawned with new hopes, evolved techniques and enlighten-

ed scientific inventions which have created miracles which mankind had never dreamt before. It is true that evolution must go on and there should be created more developed and useful methods for the society. Our science with all its modernity has been quite successful in this process. It has influenced the whole world with its spell of miraculous achievements producing desired effects without loss of time. In many ways it has porvided mechanical means of giving comfort to the society in the daily life of the individual. None can deny the benefits which science has conferred on man. But at the back of glamour of this modern science there is that Supreme Power which moves the world and of which the present day science is but a small manifestation.

One may argue, I have discovered this; that has been created by him and so on. But in the ultimate analysis one has to admit the existence of some Supernatural and Eternal force which created human beings and gifted them with creative faculties to discover and create things in this world. If that force would not have been there, nothing would have been created in this world.

It is only proper that all heads bow down in reverence and seek shelter in the lap of that Supreme Power. It is from there that all thinkers, philosophers and scientists seek their knowledge and inspiration. It is He who pervades the minds of all and provides inspiration to do things.

The recent scientific advances have created a tussle between ethics and modern material existence. Man is tempted to achieve more and more personal facilities through scientific appliances in the shortest possible time and consequently most of the religious and ethical considerations have to give way to this new scientific current. It has produced a craving in the minds of man to acquire wealth and endless worldly possessions, creating a severe diversion of mind from old and ethical values of life which had built up the highest morale of the society and which values often seem to be lost sight of today. As a result the society has lost its cultural moorings and has become a confused mass.

One realises this when the electric current fails and one has to make alternative arrangement of a lantern; or when the lantern also fails due to some defect and one has to carry on with the help of a 'Deepak" (oil lamp); or ultimately when, that too fails due to gust of wind, one has to move in the light of his Father. It is then that one loses one's craving sense and then the Divine Father helps him to brilliantly lighted place of which he had no hope. If one gets light after these disappointments he will not lose his balance of mind and will preserve that more carefully as he got it through the grace of his Father. If per chance he loses this light again, he will try to have another one patiently and honestly rather than through craving or fighting for it. Because this time he will have that much of patience and assurance that even if he fails to get it, his Father is there to lead him and to show him the light out of darkness.

Moreover, these scientific appliances are so costly that their use is limited only to a particular sphere. They do not reach to the poorest of the society. The teeming millions of India who live in villages, far away from the dazzle of the cities, have to depend upon what they can afford through their scanty resources. Had they been completely materialistic in their outlook which is the blessing of the modern scientific age, it would have been impossible for them to pass even a single day of their life in our villages. Consequently, there would have been

great chaos and upheavals in the society. The whole balance of the society would have been upset creating unthinkable state of affairs.

It is the spiritual motive force and cultural values of the past which have been balancing the society until now and due to which, trials and tributaions of life do not unnerve the society and it has the patience to bear whatever comes to its fate with faith and fortitude. In other words it is always prepared for the worst. Hence this cultural aspect is the most important one. Every child born in India first learns to imbibe this cultural heritage of the ages past before he is initiated to other aspects of development of life.

It is true that our scientific techniques are directed towards improving the economic lot of the people but equal stress—if not more- should also be laid to their moral and cultural development so that increased economic status should be accompanied with higher moral standards of the society.

I don't mean to say that these modern scientific advances and improved techniques are harmful to the society and they should be abandoned. But I wish to stress that our cultural values are more important and deep-rooted in Indian civilization and they have such marvellous controlling and uniting power for the society that to temper with them at any cost would lead to disintegration and disorganisation of the society.

Therefore, the morals of the people should always be maintained at the highest level. Whatever plans have to be executed : whatever publicity com-paigns and social education programmes may have to be launched should consist in the ratio of fifty-fifty for the develop-ment of both moral as well as economic aspects of people's life.

Our success finally depends upon the social education programmes. Only this media of mass education can work effec-tively to produce the desired results. Though, it has been designed to form the spearhead of all community development programmes in theory, but it has yet to establish its utility in a practical way as it is the most important aspect of plan-ning to provide drive to the execution of programmes.

Of course, there is the time factor which becomes important at times. But in the matter of building the "Character" of the nation, we should insist on the basic need of the society. For the nation, "Character" should have priority over every other aspect of national develop-ment.

ACHIEVEMENT OF TARGETS

(Means Or End)

By: **P. N. PATHAK**

TARGETS are fixed for each sphere of development so that the development programme may go ahead in a phased, scheduled and systematised manner. The achievement of target is generally the test of an organisation and its officers' capabilities and efforts that they put in their assignments. Any institution or individual entrusted with completing the specified work in a specified time may take the task to his heart and devote himself whole-heartedly in making the task successful; yet it is possible that his target may not be reached. He may

have attached more thought and energy to the intrinsic value of his programme and may have succeeded only in creating favourable conditions for the ultimate success of his task by enlisting real public support and doing good spade work.

On the other hand, it is possible, that another executive officer may have hurried up to achieve the so-called targets, without paying much heed to the real value of his task. He may have been able to achieve 100% targets or even more but he may have done only little or temporary good to the country and to the people in particular for whose good he is believed to have achieved the targets.

A surface study of the development programme shows that achievement of target is a prima facie evidence of having done something according to the plan. But if we want to study whether the targets have beon achieved after honest and sincere efforts, whether their effect would be permanent or temporary, whether they would do real and continued good to the people in an anticipated manner are the questions which make some of us pause to think and replies to these questions would come from an examination of a simple question whether achievement of targets had been treated as a means for national reconstruction or as an end in itself.

In the development programmes when targets are fixed, it is believed and rightly so, that if work is undertaken and executed according to the plan and the targets are achieved, the anticipated improvement in particular spheres will necessarily follow. It is obviously left to the people in the field to execute the plan thoroughly and to ensure that the plan is executed in a manner which may bring about maximum return in terms of greater happiness to the people for whose sake the plan is executed. On a closer scrutiny we observe that there is great difference from the point of view of the community between the targets achieved with sincere efforts and with future chances of continued good to the people and the targets physically achieved but with little prospects for future good propagated to have been ensured for the people.

Rarely do we study that a ton of fertilizer may be consumed in a village with or without necessary instruction and demonstration to the farmers who purchase it and use it as manure on scientific lines or in their own invented manner makes much difference from the point of view of production to the farmer and the community. Adult education centres may be established where adults may come casually or regularly and the targets will be said to have been achieved but the good would come only if the adults receive education regularly and they are made to feel the need and use of educating themselves. Training in Arts and Crafts and Cottage Industries may be given to trainees and targets therefor may be achieved but the training is illusory to the trainees and the community unless the training is complete in all respects and enables the trainees to earn more by undertaking production on improved lines and by marketing their products through co-operatives or some other non-exploiting agency. Increase of percentage within co-operative fold is also not the real progress towards co-operative Commonwealth unless present exploitation by money-lenders, traders and middlemen is reduced by Co-operative Movement in some material proportion. Likewise, in all aspects of development, we find that there is some variance in the effects of the targets achieved, and it depends on the degree of honest and sincere effort put in.

How many of us look at the achievement of targets as a means for the attainment of the programme of economic well-being of the community or simply as an end in itself. Few ever think about it and still fever people take the achievement of target as a means for making India of tomorrow a land of better fed, better clad and happier people. Those who have to work for the achievement of the targets should take their targets not as an end in itself. Their task is no ordinary task which needs only execution without spirit, liveliness and a sense of importance, but is of vital importance to the community to-day and to-morrow. Well placed stones in a foundation of a building may not be seen but who can deny that they are the real support of the building.

If we want to achieve maximum good from the Second Five-Year Plan, officials and non-officials will have to realise that in achieving targets within their small sphere they should not consider their task as a load to be carried upto a destination, but as a noble assignment on which, in howsoever small a way, not only the succees of the Second Five-Year Plan but the prosperity of the country as a whole depends. Those who have the sacred privilege to execute the plan, should feel that the achievement of target is not an end in itself but is a means for making a number of persons happier : for bringing in more goods to the market: for making particular localities better places to live in: for releasing certain groups of helpless persons from the exploitation of some powerful group: for bringing into light those who have remained in darkness for generations due to illiteracy and ignorance.

The present and the future prosperity of individuals, groups of individuals and the nation as a whole depends on the achievements of the targets fixed under the Second Five-Year Plan. Hence it becomes our moral responsibility to see that the targets are not only achieved physically and on paper but that sincere efforts are put in and that all preliminaries are completed and necessary conditions created under which full benefit may be derived by those for whose sake planning is done, targets are fixed and subsequently achieved.

AGRICULTURAL PROPAGANDA AND EXTENSION WORK

(Organisation And Personnel)

By : **H. M. DESAI**

THE Agricultural Department of the Bombay State is under the control of the Director of Agriculture whose Head Office is at Poona. There is a separate Minister in charge of this Department along with the Forest Department.

The Director of Agriculture is assisted by a Joint Director and Deputy Directors at the Head-quarters. One of the Dy. Directors at the H. Q. is in charge of the District Propaganda and Extension Work. Formerly the post of the Director of Agriculture was held by an I. C. S. Officer. The Royal Commission on Agriculture recommended that the Director's post should be held by a technical man. Accordingly, the Principals of the Agricultural College, Poona and the Deputy

Directors of Agriculture held this post in the past. Very recently a departure has been made in this practice by appointing revenue officer to this post.

The Agricultural Department is divided into the following sections for administrative purposes :—

1. Education,
2. Research,
3. Propaganda and Extension, and
4. Engineering.

Agricultural colleges are in charge of the Principals who are directly responsible to the Director of Agriculture. The experts at the Agricultural College, Poona, are advisers to the Government in their respective subjects and are directly responsible the Director of Agriculture. They work as experts in addition to their duties as professors at the college under the administrative control of the Principal. They have thus dual position, one as professors at the college and the other as advisers to the department. In addition there are other experts like the Live stock expert, Agricultural Engineer, Crop Botanist, Cotton Botanist, Cotton Development Officer etc., who are not connected with colleges but directly responsible to the Director of Agriculture for their work. Some of these experts have farms in the districts under their direct control.

Agricultural activilies in the districts i. e. Education, Research, Propaganda and Extension, Live stock Development, Engineering services, etc., are under the general supervision of a Divisional Deputy Director of Agriculture assisted by the district staff. In a division there are 5 or 6 districts.

While the District Agricultural Officer is in charge of each Prant of a district in each taluka there are about five agricultural assistants.

After the introduction of N.E.S.&C.D. blocks under the 'First Five-Year Plan' the propaganda and extension work in selected areas was placed under the charge of the Revenue Department with the result that the Head of of Taluka became in addition a development officer also. To help him in the agricultural development work the services of agricultural officers are placed at his disposal. For actual field work a cadre of Gram Sevaks is created. The Gram Sevaks replace the former circle Inspectors. Each of them is in actual charge of one village as a Talati and Supervising officer for additional nine villages. Gram Sevaks are trained at the training centers especially opened for the purpose. They are trained in rural development subjects in addition to the Revenue work. The district Agricultural Officer acts as an adviser to the N. E. S. or C. D. Block situated in his district. The Divisional Deputy Director of Agriculture is consulted by the Collector of the District or the Deputy Collector in charge, in matters of policy.

It will thus be seen that, in N. E. S. and C. D. Block areas the development work is carried out by the organisation set up for this purpose with the Block Development officer of the Revenue Department as a Head. The District and Divisional Officers of the technical departments act as consultants or advisers.

The general policy frame work, of the development programme to be undertaken in each unit is prepared at the Higher Levels and targets are fixed at the unit levels.

The burden of carrying out the actual field work and the fulfilment of the assigned targets at the Village level falls on the village level workers. His main duties are of a revenue nature and the development work is only complementary to it, for which he receives instructions

from the officers of the Development Departments and carries them out. In actual practice the welfare work does not receive prompt attention and falls into the rut of routine. The village level worker is too weak to bear the extra burden of the development work he is loaded with. To add to this he lacks full equipment to shoulder the multifarious responsibilities which are entrusted to him.

The Agricultural Propaganda and Extension work, outside to N.E.S. and C. D. Block areas is carried out by the staff of the Agricultural Department. The programme of work for the District is prepared by the District Agricultural officer in consultation with his field workers and is then submitted to the Deputy Director of Agriculture for approval as a part of normal official routine.

Thus, in the District programme outlined by the Agricultural Department there is no place for rural welfare work. The programme only deals with the introduction of agricultural improvements generally suited to district conditions.

The District Agricultural Officer supervises the programme of work in his district. The Deputy Director of Agriculture pays periodical inspection visits. He seldom visits the interior areas as he has neither the time nor facilities for such visits. During his visits it is not possible to him to come in contact with the different strata of the rural population. He is usually not fully conversant with the social and economic conditions of all the areas under his charge. Accordingly, while framing the development and extension schemes the whole picture of rural areas with their peculiarities is not before him. The schemes prepared are therefore of general nature and do not suit all the sectors of the rural population of the areas of operation.

Decisions on matters of general policy are taken at the Head Quarters generally in consultation with the Divisional Deputy Directors. It is possible as may be seen from the facts set out above, such as the personal bias of officers, nature of crops, trade preference, vocal leadership, natural advantages i. e. nearness to Head Quarters, easy approach, facilities of camping etc. might inadvertently be playing their part in fixing up priorities in the formation and launching of the departmental schemes in the State. It is a common knowledge that in the past some few favoured areas got preferential treatment over others in the matter of launching the development schemes in the State, It may also be observed that, the legislatures in the country were a little indifferent to such matters in the past with the consequent lop-sided developments in certain areas.

In short, it may be pointed out here that the organisation of the Department as it exists today is very weak and requires to be reshuffled in such a way that all the areas in the State get equal opportunities and a fair deal in matters of development. It may also be noted that as their working shows the N. E. S. and C. D. block arrangements are only poor substitutes for the Department's working and have to be replaced by a more efficient and effective organisation.

The personnel of the Agricultural Department consists mostly of Agricultural officers and agricultural assistants in the subordinate cadre. There are a few officers belonging to Bombay Agricultural Services class II and class I.

The officers are agricultural graduates who have passed out from the agricultural colleges. Most of them, especially in the higher cadres, are also graduates of foreign Universities. Agricultural assistants are men knowing the regional languages, trained for two years in agri-

cultural schools or at the Training centres. These men are field workers and form the bulk of the staff of the Agricultural Department. The syllabus at the training centre includes, in addition to agriculture, all other subjects pertaining to Rural Department.

It is the experience of those who are in close touch with the work of these assistants that they are not equal to the tasks which are assigned to them. Their training and experience ill equips them for going to the seasoned farmers and advising them properly. The training imparted to Gram Sevaks in the new set up also does not equip them properly in the matter of giving advice and guidance to the farmers.

The Agricultural Officer, who is an agricultural graduate, is trained in scientific methods of Agriculture and, with suitable experience on the farm and working under a senior officer, is better fitted to work in the rural areas for the agricultural development work. For getting clear grasp of the rural problems and for doing welfare work, for suggesting or offering suitable solution of the problems a lot of experience of rural conditions is required which most of the District Officers have neither opportunity nor the time to gather and to digest.

It is believed that the agricultural graduate has too much of specialised training and is not adequately fitted for the general rural development work which he has to undertake in the new set up. To be useful, his training has to be broad-based.

With the welfare work now forming part of the rural development work, the workers in rural areas have to be men with good grounding in fundamental sciences, good grasp of rural environments and farming problems. They have to be acquainted with socio-economic condition of the rural population and in addition to this, must have made an intensive study of one of the phases of rural development i. g. Agronomy or Animal Husbandry or Veterinary science or Rural co-operation or Rural Economics and Sociology or Forestry or Rural Health and Sanitation or Small scale Rural Industries or Rural Education or Agricultural Engineering etc. In short, a rural worker must have a thorough knowledge of the conditions under which he has to work, material and method available in rural areas and the human factor involved in all this. Accordingly, in the new set up our educational system has been found to be completely wanting and has therefore to be completely overhauled.

In this revised programme of education there should be ample facilities for both general and specialised training both for men and women students.

From this brief discussion it will be apparent that for fulfilling the difficult programme of Rural Development under the "Five-Year Plan" for which incidentally a huge provision of fund has been made, the present organisational set up is completely unsuitable and inadequate. The Revenue Department, which is saddled with this welfare work in the Bombay State, is over-burdened with its own departmental work and has neither the understanding nor the time nor the training nor the aptitude for such type of work. It is too authoritative a department is andunsuited to take up development such work which requires patience, perseverance and imagination.

What form the new organisation should take up must be decided by the collective wisdom of all those who have personal experience of such type of development work.

Planning the right type of training for the personnel requires deep thought. The training imparted by the present Agri-

cultural colleges has outlived its usefulness.

It is suggested that the existing agricultural colleges should be turned into the Rural Development Colleges. There should be two years' general courses in fundamental and social sciences. The third year should be devoted to the study of rural conditions mainly through the practical work. A year or year and a half should then be devoted to specialization of any one of the Rural Development subjects. To attract better class of students a few posts should be reserved for direct recruitment to the higher cadres.

The evaluation reports on the working of N. E. S. and C. D. Blocks has repeatedly pointed out the inability of the present form of organisation for delivering the goods. The observers who have seen the working of N. E. S. and C. D. Blocks have also not reported favourably on the progress and results achieved so far by these organisations.

There is an urgent need to examine the whole question with a view to evolving a realistic organisation for the Rural Development work along with suitable methods of training of personnel for its execution.

RATIONAL WAY TO "GROW MORE FOOD"

By : **NAUTAMLAL C. TEJPAL**

FOOD production could be increased in the shortest possible time by better seeds, proper manuring, crop rotation, proper spacing, contour making, terracing and bunding. These do not require expensive propaganda or huge irrigation schemes.

A model farm which will show the proper way of farming and which will produce better seeds to be supplied to the farmers, can increase our food production by 25% in the existing acreage we have and with existing irrigation facilities.

I have seen a few of the "Grow More Food" propaganda films, which were considered to be the best by the exibitor. I had to say that such a propaganda is not only a criminal waste of public money, but waste of valuable time of the farmers who are induced to see such pictures.

The orthodox farmer believes what he sees. And only a model farm can show him the proper way of farming. The expensive experiments of Poona and Pusa Government farms can be copied in the model farm, so that the successful experiments of Government might reach the farmers of the whole of India in the shortest possible time.

The cost of a model Farm will be anything between Rs. 15,000/- to Rs. 25,000/- according to the nature of the soil, water facilities and the situation of the Farm.

Implements and accessories of a Model Farm :—

(1) 15 to 25 acres of land with ample water supply.

(2) Residential houses in the farm.

(3) One pair of bullocks.

(4) One service-bull.

(5) One pumping set for lift irrigation.

(6) One Chaff cutting machine.

(7) A set of sprayers and dusters to control plant disease and disinfect plants.

(8) Chemicals to control disease and disinfect plants.

(9) Medical supplies for the villagers.

(10) Books and forms to keep statistics of the farm and surrounding ten villages.

(11) A library, a hostel for Government officials and other guests.

(12) Simple soil analizer.

The farm should be supplied as above, less or more according to the finance.

The duties of the Model Farm

It should be a kind of Cultural Centre for the 10 villages, where the farmers could see for themselves the advantages of proper seeds, proper manure, bunding, terracing, contour farming, control of the plant disease etc.

The farmers are given advice about crop rotation and supplied with chemicals at reasonable prices and implements on hire for the control of the plant disease.

the model Farm will be a kind of a centre or a school to teach experienced and orthodox farmers the new way of farming by practical results.

The model farm management is connected with the Tractor station, which in case of demand would hire the tractor for farming or bunding to stop soil-erosion, and also supply plants and seedlings to grow trees.

A Co-operative Society could be added to the Farm.

Also a centre for village and cottage industries could be added, to supply raw materials and purchase the products of village industries at reasonable prices.

A model and cheap storage facilities to store grains properly so that the same are protected from germs and rats could be erected.

In the model farm the same implements of farming should be used as in surrounding villages, so that the villagers may not have any difficulty in copying the farming system.

Personnel of the model Farm

A literate farmer, who has adopted the proper method of farming, should be given the farm, tax-free.

After the farm is supplied with necessary implements, the farm must be self-supporting.

With the farmer, there should be a matric educated clerk who would keep accounts, up-to-date statistics of the 10 villages, statistics of all kinds including births, deaths, food production, rain, weather, number of trees, soil-erosion, and render medical help with simple medicines and keep in touch with the Central Organization of the model Farm, manage the library, receive paying guests including Government Officials, collect charges for service bull, sell certified seeds, supply chemicals and hire dusters and sprayers, disinfect the plants, village drinking water etc. All the services to be rendered to the villagers at reasonable rates from which this person should derive the income.

Finance to start the model Farm

The motor car and atom bombs have made tremendous changes in the lives of Europeans and Americans. Every well-to-do person living in a town has a country house with a few acres of land, where he can reach easily by car and where he produces 70 to 80 percent of his food requirements. So in case the cities are atom bombed, he can drive to his country house and save himself from bombs and starvation. Such country houses are situated from 15 to 50 miles from the big towns from which an hours' drive will bring him the peaceful and healthy country life for himself and his family. Our rich people are busy making and hoarding money for their children

and great grand children but none of them has ever thought of inheriting the good health and dignity of labour for their children by living a healthy life in a decent style on countryside.

So the moneyed people who have cars should be tempted to invest in model farms, which would cost them no more than the price of a good car, and supply them with wholesome food, milk and butter of their own.

There are two ways of financing a model Farm :—

1st. A capitalist should buy a farm for himself and staff the same by his own men at his own expense and then join the Model Farm Association by which he has to run the farm according to the instructions, rules and regulations of the Model Farm Association. He has every right to the production of the farm.

2nd way is that a capitalist should donate 15,000/- to 25,000/- rupees for a farm, and its equipment and leave the farm as a trust in the hands of the Model Farm Association, by which he gets one-fourth or one-fifth of the products of the farm in kind. He can have his own grains, vegetables and butter from the farm. Now if he pays Rs. 15,000/- he gets the share for the next 15 years, and if Rs. 25,000/-, he may get the share for 25 years and so on after which the farm becomes the property of the Association. No share is to be given to anyone.

Further there should be Advisory Board of each model Farm in which the donor or the financier is the member, also village headmen of the ten villages should be the members of the Board, who should keep in touch with the development of the farm and the villages of their own. The shrewd business man will see that the farm is run economically and is a success. The other members of the Advisory Board have to see that the fullest advantage of the farm is taken by each of the ten villages.

Now such a model farm for a group of a unit of every 10 villages of India will make a tremendous change in the whole economy of India.

For the first five years, it would be difficult to get the proper staff for such farms but after a few years we might be able to educate the necessary personnel for running such farms. As the British had arranged our education to get clerks and officers to staff their administration, we can educate people to staff such farms.

Further for the unit of every 1000 villages, there should be a Government experiment station and a weather report station, with which the model Farms are connected. This experimental farm should be run at the expense of the Government.

Above scheme requires very little expense from the Government, and can be elaborated and made fool-proof after further discussion.

But the difficulty of such inexpensive scheme is that the Government's present administrative service will not support any scheme, which is inexpensive and simple. Tne reasons are not far to seek. The late Dewan of the late Thakore Saheb of Rajkot, Shree Virawala, purchased a silver carriage and a Rolls-Royce car for the Thakore Saheb so that the Dewan can get a fat commission on such expensive articles. Our present service men are made to believe in a higher standard of living than their regular salaries could afford. So they sponsor only expensive schemes, food-control, export-import licensing, textile control, etc. in which the party concerned gets fat returns, and the consumer has to pay higher prices through the nose, though the people are made to believe that such schemes are for the good of the nation. So the inexpensive and simple schemes

even of such a person as Gandhiji never got a chance. We all know Gandhiji was against the controls, which have degraded the whole nation including the high placed Officers and Ministers to a common black-marketeer, or the patron of a black-marketeer.

The Government to maintain itself in power is making propaganda that they are doing or have done this and that scheme for the good of the people. But almost in every instance, if one goes deep, one can show that the spending by the Government is not only a sheer waste, but criminal waste of public money.

This, I am compelled to write, not to support one political party against the other. I honestly believe that a Socialist or any other Government will be worse than the present one. But the present Government, in order to save the country from chaos and worst type of Communist rule, must manage the affairs of the nation more rationally and properly.

SEED SELECTION FOR BETTER CROPS

By: **G. H. DIXIT**

EVERY living being whether man, animal or plant in this Universe is bound to meet its own end sooner or later and this is the reason why every living individual is anxious and desirous to perpetuate its own race or kind. Every living organism is endowed with this power of reproducing its own race, by nature, to retain its heritage from times immemorial. Had there been absence of this power, there would have been no living being or life in this world and it would have been a dumb lifeless drama of the immovables.

Like human beings, Cattle and Birds, Plants also possess life in the form of living protoplasmic mass, and hence they are equally eager and anxious to see that their heritage is maintained and their race is perpetuated. There is a regular struggle for existence between the individuals in their own sphere of life and those who are the fittest only survive. As such Plants also have to justify their existence on the strength of their fitness for existence, for perpetuation of their races. Plants therefore try to perpetuate themselves in two ways; viz. (i) Propagation and maintenance of race by reproduction of seed i. e. by sexual method and (ii) by Asexual method i. e. by vegetative propagation.

Sexual Reproduction :—This is by far the commonest method of reproduction in plants, similar to one possessed by human beings; animals and birds. As such Plants reproduce their kinds by the fusion of male and female gametes. This fusion takes place in two ways i. e. fertilisation of Ova by the pollen from the same flower which is known as self fertilisation or that from the pollen of the same kind of flower borne on other similar plant and which is known as cross fertilisation. Seed produced as a result of selfing is not so vigorous as that of the seed produced as a result of natural crossing. This is known as natural cross fertilisation.

There is one more method of reproduction of seed and it is known as "Hybridisation". This is a method of seed reproduction wherein the human agency plays an important part in bringing together the desired characters of one parent and introducing the same in another parent

by artificial crossing. Here the hybrid vigour manifests itself in the resulting progeny. Hence the plants reproduced by any of the above mentioned methods are known as seed plants. The seed thus produced carries within itself a miniature plant of its own kind known as Embryo, which germinates on getting favourable conditions like moisture, heat, light and air and maintains itself on the reserved food material stored in their cotyledons in the form of Endosperm, till they are fit enough to get their food from the soil through their roots.

The plants or crops which are produced from seed more or less prove true to their types, but usually they are affected by the environmental conditions such as soil, climate, manures, etc. etc. in which they are made to grow. As such they are likely to be unstable and liable to immense changes in their original constitution and to get affected by acquired characters in their resulting progeny.

We, as Scientists and Cultivators, are more concerned with Crops obtained from seed plants. Crops are governed by the same rule as "Like begets like" and as such seeds are likely to inherit the good or bad qualities of their parents and are also likely to be affected by the environmental conditions under which they have been made to grow and as a result of this i. e. acquired characters, a number of varieties of the same crops could be found or evolved. It is at this stage that the Scientist comes in and he has to play an important role in evolving or selecting a good quality of seed and putting it in the hands of illiterate farmers of our country to give them Bumper yields, Bumper crops and thus put more money into their pockets.

It is an established fact that "Better seed produces Better Crops" and for this after a good deal of trial and experiments the breeders have arrived at certain conclusions for adoption by farmers for selection of good seed from a standing crop for their next crop. The following are the attributes of good seed :—

(1) Good seed must be selected from a healthy crop of the uniformly well ripened field.

(2) The field or portion of the field from which the seed is to be selected must be of uniform standard true to type. The field should be free from insect or disease pests.

(3) Selected seed should be from the early maturing variety.

(4) Selected seed and crop yield should command ready market and fetch better price and should be popular with Mandi requirements and Consumers.

(5) Selected seed should be quite fresh, plump, healthy, clean and well dried-up.

(6) Good seed should be selected from healthy, well developed heads or cobs or fully developed legumes in case of pulses and other leguminous crops.

(7) Selected seed should be weighty and bright in colour and appearance.

(8) They should not be thin, unripe, cut or weeviled.

(9) They should be from a pure crop and not from a mixture of several types grown together in the same field.

(10) They must be free from seed of weeds.

(11) Seed which gets ripened with a lesser quantity of water is supposed to be a good seed for sowing purposes.

Thus after selecting good seed, keeping in view the points mentioned above, the next question that arises is with regard to its proper storage till it is used as seed for the next crop. It is imperative for every good farmer to keep his own selected seed in sufficient quantities according to his own requirements in order that he should not depend for the supply of seed from Government Agencies or from Sahukars year after year. On the other

hand once when he is convinced of the superiority of his selected seed he should try to multiply the same on large areas to meet the requirements of his own as well as of fellow brothers and also to help the Govt. agencies in the matter of supply of good seed to other farmers.

It is for this reason that he should take particular care to see that his seed is properly stored and its viability is maintained. While storing seed care should be taken to see that they are not moist, but are quite clean and well dried-up. The seed coat of well dried-up seed gets hardened and does not become liable to the attacks of stored grain pests or diseases. After harvest and thorough cleaning and drying, the seed should be packed in gunny bags and their mouths be stitched up and stored in well protected and ventilated seed godowns, whose floors and walls should be got previously painted with Coal Tar to kill the sticking eggs and insects.

These bags should then be kept on a thick layer of Bhusa spread over the floor and covered on all sides with thick layer of the same so that the seed may not absorb rain moisture. This is all the more necessary for storing Rabi seeds. In case of Kharif seeds they should be exposed to sunshine to thoroughly dry them up before the Summer season sets in, to avoid danger of sprouting in Summer if the seed possesses moisture. Particularly this is very necessary for stored paddy seed.

It is also quite important for every farmer to test his seed prior to sowing. This can be done by taking a few counted number of seeds, test their viability or germination capacity in moist saw-dust, soil or on a piece of moistened blotting paper. They should be kept covered with either thin layer of soil or saw-dust or moist blotting paper to effect sprouting for 2/3 days. The farmer should everyday take out sprouted seeds and continue the process successively for 2/3 days and then finally count the number of sprouted seeds to find out the percentage of good and viable seeds. The farmer should also take care to treat his seed prior to sowing by some insecticide such as Sulpher, Dust, Agroson or perenox so that his seed will be free from seed borne diseases like smuts. Thus with above mentioned precaution for selection and storage of good seed every farmer is likely to get a bumper crop.

Another method of reproduction spoken of above is by Vegetative propagation or Asexual reproduction. This consists of reproduction by means of Cuttings, Buddings, layerings, grafting, etc. This is an extra quality of reproduction possessed by certain plants in addition to their reproduction by sexual method. This method of reproduction is more commonly found in fruit plants, ornamental plants, a few spice and vegetable crops and sugarcane. While selecting vegetative parts for further propagation it is equally necessary to select healthy, disease free cuttings and plump and well developed buds from healthier and vigourouslv growing plants so that the resulting crop gives better yield.

INDIA'S FOOD POTENTIAL

(Intensive Cultivation)

RICE

By : **P. C. BANSIL**

IN India, about 70 to 80 percent of the energy requirements of the people are derived from cereals[1]. "Dhanya", one of the Sanskrit names for rice means the supporter or nourisher of mankind. And rice from among the major cereals rightly occupies the first place in the food economy of India. Table No. I shows the place of rice in the area and production statistics of the country.

1. Dr. V. N. Patwardhan, Nutrition in India, p. 8

* Cf. Rural India, September 1956, In the previous issue.

TABLE NO. I
Rice Statistics for All India.

Year	Area: Net area sown.	Area: Area under cereals.	Area: Area under rice.	Percentage of 3 to 2	Production: Total cereals.	Production: Rice	Percentage of 6 to 5
	(In million acres).				(In million tons).		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1947-48	245.5	169.0	63 2	37.4	43.7	21.2	48.5
1948-49	244.0	167.0	63.5	38.0	42.3	22 6	52.2
1949-50	283.2	194.3	75.5	38 9	46.0	23.2	50.4
1950-51	293.4	199.3	76.7	38.5	41.7	20.3	48.7
1951-52	296.4	200.6	75.6	37.7	42.9	20.7	48.3
1952-53	309.8	203.2	74.2	36.5	49.2	22.5	45.7
1953-54	314.0	210.4	76 6	36.4	56.1	27.1	48.3

Source :—Area figures are from Indian Agricultural Statistics, 1951-52, Vol I, and production from Abstract of Agricultural Statistics, India 1952, 1954. Figures for 1952-53 and 1953-54 are from Area and Production of Crops in india, February, 1955.

It would be seen that about 26 to 28 percent of the area under cereals is accounted for by rice alone. Nearly 50 percent of the total cereal production is also shared by rice. This, in other words, means that about half the population of India depends for their energy requirements on rice. Notwithstanding all this, existing yields (though by no means uniform throughout the country) are, perhaps, the lowest in the world. Table No. II in this connection will be of interest.

Table II
WORLD YIELDS OF VARIOUS FOODGRAINS

No	Country	Yield per acre in pounds. Rice**	Wheat**	Maize	Barley
1	Canada	—	1032	—	1524‡
2	Maxico	1940	732	—	—
3	U. S. A.	2066	1032	2065*	1103§
4	Denmark	—	2964	—	—
5	France	2655	1470	—	1536‡
6	Italy	4050	1218	2079†	—
7	Spain	3627	888	—	1272‡
8	U. S. S. R. (1935-39)	1904	714	—	—
9	U. K.	—	2136	—	—
10	China	2201	936	1284†	1004§
11	Siam	1391	—	—	—
12	Japan	3281	870	1392†	1909§
13	Egypt	3155	1560	1799*	—
14	Argentine	2187	894	1748*	—
15	Australia	3906	534	—	—
16	New Zealand	—	2286	—	—
17	India Z	739	599	640	781

* Report on the Marketing of Maize and Millets in India, p. 9.

** United States Department of Agriculture, Agricultural Statistics, 1949, but for India.

‡ Quoted by Chowdhry Mukhtar Singh, Rural India, *op. cit.*, p. 14. Original figures were in bushels. They have been converted into lb at 60 lb for a bushel.

§ Thompson, Population and Peace, *op. cit.*, p. 229 for 1938-41.

† Nanavati and Anjaria, *op. cit.*, p. 43.

Z Abstract of Agricultural Statistics, India, 1952, for the year 1947-48.

(Also refer to W. Burns, *op. cit.*, p. 57. and India in World Economy, Publication Division, p. 10 for such a comparative study).

Environmental Conditions

Before we examine the effects of various indigenous factors like water, seeds and manures on rice, it would perhaps be fruitful to study the conditions most favourable for its growth.

Soil

Bruce,[1] Graham[2] and Pendleton[3] have made some useful studies of the soil conditions most favourable for the growth of rice. Grist,[4] after a discussion of all of them, concludes;

"Provided that the water supply is adequate, paddy cultivation is possible on a wide range of soils, both light or heavy, although the crop favours a heavy soil with an acid reaction. Many unpromising soils may be built into good paddy—producing soils by cultivation and heavy manuring."

Climate

Climate and environmental factors have a great effeet on rice yields. Although rice is one of the cereals of the

1. Bulletin by A Bruce, Department of Agriculture, Ceylon.
2. Graham, R.J.D., Memorandum Department of Agriculture Ind. Bot., 7, No 7, 1913.
3. R. L. Pendleton, Nat. His Bul., 14, 1947.
4. D. H. Grist, Rice, op. cit., 19.

Table III

YIELD OF CLEANED RICE (CONVERSION RATE 70 PERCENT PADDY EQUALS CLEANED RICE) IN POUNDS PER ACRE IN DIFFERENT DEGREES OF LATITUDE, NORTH AND SOUTH OF EQUATOR.

Latitude 0 to 10°		Latitude 11 to 20°		Latitude 21 to 30°		Latitude over 30°	
ASIA :							
Malaya	838	Burma	856	India	821	Iraq	847
Ceylon	508	Indo-China	598	China	1,588	Korea	1,302
Indonesia	865	Thailand	785			Iran	1,204
		Philippines	669			Turkey	1,757
		Formosa	1,516			Japan	2,301
						Manchuria	1,177
EUROPE :							
						Italy	2,891
						Bultaria	1,516
						Spain	3,006
AFRICA & OCEANIA :							
Belgian Congo	454	French W. Africa	428	Egypt	2,292	Australia	2,810
Sierra Leono	830	Madagascar	758				
Tanganyika	437	Fiji	1,430				
NORH & CENTRAL AMERICA :							
Costa Rica	689	Dominican Republic	821	Cuba	865	United States	1,490
Panama	785			Maxico	1,329		
Colombia	678	Salvador	740				
Trinidad	1,124	Honduras	749				
		Nicaragua	624				
SOUTH AMERICA :							
British Guina	1,623			Brazil	937	Chili	1,873
Peri	1,427			Paraguay	1,436	Uruguay	2,060
Surinam	1,689			Argentina	1,971		

* Reproduced from D. H. Grist, Rice, p. 268.

torried zone, 90 percent of the crop is grown in Eastern and South Eastern Asia; sub-tropical and temperate climate are more congenial for plant growth than fully tropical conditions. Higher yields are, therefore, obtained under temperate conditions.

A table compiled by Grist (Table III) gives average yield of rice in various zones. It shows that with a few exceptions here and there, average yields increase with the latitude degree. Averge yield in quintals (224 lb.) per hectare (2·5 acres) in the Latitude 21^0 to 30^0 works out to 17·5, against an average for India of 9·2. The importance of temperature has also been emphasised by the FAO in their comprehensive survey of rice.[5] The crop is seldom successful in areas where the mean temperature during the growing period is less than[6] 75 degrees. Similarly the length of the days affects the yields. Shorter days hasten flowering, while longer ones delay it. Rice cultivation is thus more suitable in the South than in the North of India. Nearly 66 per cent of the world area under rice lies within Latitude 21 to 30 degree.

5. FAO Survey, Brief given in the Hindustan Times, September 19, 1952. Also E.B. Copeland "Rice - 1924" and W.R.C. Paul 'Paddy Cultivation", 1945, Ceylon Government Press.

6. According to O.H.K. Spate, op. cit., p. 211 "It is at its best when the growing season has a mean temperature of 75°F. or more and in non-irrigated areas 60–80 inches of rain."

This means that in so far as the environmental conditions are concerned, India is in quite a favourable situation with regard to the production of rice.

The Effect of Indigenous factors

Water :—

Rice is generally grown under conditions of sufficient water supply. The actual quantity needed by the crop, however, depends on a number of factors. The total needs vary not only with the nature of rainfall, soil conditions and the variety of grain but also on the type and quantity of manure, fertilizer used. Evidence suggests that swamp conditions provide constituents such as silica which are not ordinarily available in the dry soil[1].

According to Aiyer,[2] the duty of water (the number of acres that can be irrigated by one casec) varies from 50 acres to 100 acres during the growing period. He quotes certain experiments conducted on the Hebbal Farm, Mysore, to determine whether it is possible to economise the use of water without having any adverse effect on the yields. Water requirements both for the rainy season and summer crops, were as below.

Rice fields of the farm were tank irrigated and flat and the soil a black clayey loam. The irrigation period varied from 100 to 130 days from transplanting

1. V. Subramanayan, Current Science, 1937, p.5.
2. A. K. Yenga Narayan Aiyer, Field Crops of India, Government Press, Bangalore, 1944, pp. 30-31, *cf.*, Spate, *Op. Cit.*, pp. 211-12.

	Rainy season crop			Summer crop		
	No. of irrigations	Acre-inches including rainfall.	Grain per acre (lb)	No. of irrigations	Acre inches including rainfall	Grian per acre in lb.
Irrigated as often as necessary.	53	158	1920	48	135	3610
Irrigated once in three days.	34	106	1640	28	92.5	3230
Irrigated once in three days.	19	65.3	1680	20	62.5	3210

to harvesting. The rain fall was 13.42 inches for the rainy season and 6.92 inches for the summer crop. These results would show that yield increases with the number of irrigations. The difference is not, however, much between the three and five days interval. A marked improvement in yields is thus observed only with the best irrigation facilities.

Experiments have been conducted with regard to water requirements in different soils, with different varieties of rice and with different fertilizers. [1] It has been established that loam soil may require a little more water than the claycy one, yet the difference is not marked. In so far as the various varieties are concerned water requirements vary directly with the number of days the plant requires from transplanting to flowering. Again, the fields treated with ammonium phosphate need the maximum amount of water while those where no manure is used require the minimum. All this would show that best yields can be obtained only in areas of assured water supply, where the limiting factor may only be the quality of the seed and the quantity of manure, fertilizer applied.

Improved Seed

G. P. Hector in Bengal and F. R. Purnell in Madras laid the foundations in rice research. Much subsequent work has been done by K. Ramiah in Coimbatore and at other Rice Research Stations in Bengal, Bihar, Orissa and Assam. Improved early and late varieties, suitable for irrigated and non-irrigated tracts have been multiplied at Nagina (UP) for distribution.[1] The peculiarity about rice is that it has both semi-aquatic and entirely aquatic varieties. Some of them are as tolerant to dry conditions as barley. There are, on the other extreme, varieties which can keep pace with a steadily rising flood and the straw may finally be 20 feet long.[1](a) The importance of such flood resistant varieties can be well appreciated, when we realise that on an average about 4½ million acre in India are subjected to floods and salt water inundation.

In spite of all this, the progress made in India in respect of improved varieties of rice is rather slow. In Japan, where intensive cultivation is at its hight, 90 percent of the total rice area of about 8 million acres is under improved varieties which are also limited to only a few in number. As against this, the area under improved varieties in India is rather negligible[2] (only 1.2 lakh acres in 1945-46) and each State has innumerable varieties of its own. Orissa alone accounts for more than 1000[3] varieties, while in Bengal[4] they number 4000. The number of even improved strains at present, is still as large as 284 for the whole of the country and only 27 out of them have been produced by hybridization.

Inspite of all these handicaps, a good deal of research on rice has been carried out in India. The work done in the Rice Research Station, Sabour, Bihar, would in this respect be of interest.[1] Yields of Bihar Bhadoi paddies which take about 90 to 100 days from the time of sowing to that of ripening, are given below :—

Selection No.	8-20	33-7	40-1	42-7	17-4	23-11	26-6	27-3	29-1
Yield in lb per acre.	1094	1644	1488	1688	1056	1094	1875	1175	1525

1. Paper read by Mr. P. M. Ganguli at the Ninth Meeting of the Crops and Soils Wing of the Board of Agriculture and Animal Husbandry in India, Proceedings, 1952, pp. 115-117.

1. Agriculture and Animal Husbandry Research op. cit., p.p. 9-11.

2. *ibid.*, pp. 10-11.

3. Dr. H. K. Nandi, Deputy Director of Agriculture, Orissa-Proceedings of the Seventh Meeting of the Crops and Soils Wing of the Board of Agriculture and Animal Husbandry, 1948, p. 293.

4. John Kenny, Intensive, Farming in India p. 246.

1(*a*) Ritchie Calder, Men Against the Temple London, 1954, p. 113.

Yields in some of the selections like 26-6 and 42-7 are definitely superior to others. They would seem to be quite high for this class of paddy with a very short growth period.

Seed selection experiments have also been carried out all over the country at the various centres and improved varieties suitable for each area evolved.[2] Two of the Chinese varieties which have been found well adapted to high altitudes in the Kashmir Valley have given yields of 5,000 to 6,000 lb per acre and mature four to six weeks earlier than the local varieties.[3] Work is also in progress by the FAO to evolve varieties which will mature in a shorter period. There is an enormous variation ranging from 80 to 200 days, in the growing periods of rice in India. The Travancore Rice Scheme has already revealed the possibility of introducing a third crop in one year.

Besides what has been done over the last 25 years, under the auspices of the Indian Council of Agricultural Research ever since its inception in 1929, our peasant himself is an expert in the selection of seeds. According to John Kenny "the Indian peasant knows the various kinds and the right places in which to grow them.[1]" He quotes Mr. C.B. Clarks, an experienced and accurate botanist as saying about Bengal, "I do not know how, in the young state, the cultivator tells the 'uri' (wild rice) from the 'aman' (winter rice). I cannot." And Dr. Watt adds—"It is far more surprising to find the cultivator pick up a handful of dry grain and affirm that it would be found suitable to a particular method of cultivation, while he rejects an almost precisely similar grain as unsuitable." Dr. Watt further found that the *rices* of one district are often so different from those of another that, if interchanged, the one will not grow on the fields on which the other has fiourished for centuries, and remarks :—

> "Here the European farmer is confronted with a problem scarcely known to scientific agriculture; but although it is so difficult to follow his reasonings, the rice-cultivator of India will detect the one from the other with a perfectly marvellous degree of certainty."

All this would show shat there is practically no lack of knowledge, experience or even research in the country. The main factor which has militated against the use of improved varieties on a wider scale seem to be the lack of the required quantities of the improved seeds. Poverty of the peasant who has to purchase the seed at the time of sowing from unauthorised agencies, because he has no money to pay for it, is also responsible for the malady to some extent. The inadequate supply of certified seed may again be attributed to the lack of an honest and effective seed trade to take up the new varieties, to multiply them and distribute them to the cultivators at a reasonable price.[2]"

We can, however, expect that something will be done now to improve the conditions and if not more atleast 50 percent of the area may by brought under improved varieties, giving a minimum of 20 to 30 percent increase over the existing yields.

Cultural and agronomic operations

Then comes the method of sowing. The transplanting system is an improved

1. Detailed Scientific Report of the Rice Research Station, Sabour, Bihar, for 1939–40, M. Alam, Government Printing Press, Patna, 1941, p. 4.

2. *cf.*, Agriculture and Animal Husbandry Research, *op. cit.*, pp. 9–11. Report on the Marketing of Rice, *op. cit.*, p. 19; Report of the Rice Research Station, Bihar, *bid.*, p. 5. Annual Report of the Department of Agriculture in the State of Bombay-1951–52, paras 27 to 30.

3. N. Parthasarthy, Director Central Rice Research Institute, Cuttack, New Trends in Rice Production, The Indian Express December 14, 1954.

1. John Kenny, *op. cit.*, p. 246.

2. Sir John Russell, Report, *op. cit.*, p. 51.

method over the broadcast one. Experiments conducted at the various centres prove the superiority of the former method. It has been found in Orissa that transplanting would increase the yield by 3 maunds per acre[1] which works out to more than 50 percent over the existing yields.

Besides the increased yields, normal increase as a result of transplanting is taken as 15 to 30 percent. This method results in a saving of seed rate. Throughout Orissa, the seed rate per acre for broadcast paddy, is usually 40 seers (80 lb) or even 60 seers (120 lb) in some of the areas, whereas for transplanting one acre of land, seedlings obtained from 215 seers of paddy are more than sufficient. Accordingly transplanting does not require more than 1/3 of the broadcast method.

Manures and fertilizers

Rice is one of the major consuming crops and depletes the soil immensely.[3] All countries of the world (like Japan, Spain, Italy, Egypt and Australia) where rice yields are the highest, apply manure at a high scale. According to Leonard rice fields in these countries receive 58 to 135 lb. of nitrogen per acre, 35 to 90 lb. of phosphoric acid and 50 to 100 lb. of potash - both from natural as well as artificial sources. From among the artificial manures ammonium sulphate, calcium cyanide, superphosphate, potassium sulphate, and potassium chloride are, however, in great demand. [4] Experiments have been conducted in India also on the field of the cultivator. With just 20 lb. of nitrogen, increases of the order of 20 to 36 percent [5] more have been obtained. Dr. Burns after giving details of the results obtained estimates that "increase may be anything from 20 to 150 percent, depending upon the variety, soil, climate and season". [6]

A large number of experiments were also conducted under the auspices of ICAR in Bengal, UP, Bihar, CP & Berar, Assam and Orissa upto March 31, 1944.[1] The conclusion reached was, "that in ordinary years the use of a well-balanced fertilizer would increase the harvest enormously and its continuous use would so improve the paddy crop that the present poverty of the peasant would soon be changed into comparative wealth".[2]

What is important in the case of rice is the actual quantity of nitrogen supplied. Twenty pounds per acre is taken as the minimum dose and there are indications according to the ICAR that the dosage can be profitably increased to 60-80 lb in certain centres, particularly where the average level of fertility is very high. The achievements of Indian cultivators under the Crop Competitions (Table IV) are another indication of the extent to which production can be raised. Besides water and improved cultural practices, the deciding factor in their case has invariably been the actual quantity of the manure/fertilizer applied.

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1. & 2. Agriculture and Animal Husbandry Research, *op. cit.*, p. 17.

(*a*) Food and Agriculture Notes, The Hindustan Standard, March, 21, 1952.

3. *cf.* H. W. Jack, Rice in Malaya, Department of Agriculture, Malaya Bulletin 35 (1923); D.L. Sahasrabuddhe, Department of Agriculture, Bombay, Bulletin No. 154 (1928); and V. D. Wickzer and M. K. Bennet, Rice Economy of Monsoon Asia.

4. W. H. Leonard, Journal of American Soc-Agron. 40(1948) Quoted by Grist, *op. cit.*, p, 190.

5. F. Yates, D. J. Finney and V. G. Panse, The Use of Fertilizers on Food Grains, ICAR, 1955, p. 4.

6. W. Burns, Report *op. cit.* p. 52.

1. Agriculture and Animal Husbandry Research, *op. cit.* pp. 10-18.

2. John Kenny, *op. cit.* p. 251.

Table IV

RICE TARGETS REACHED UNDER CROP COMPETITIONS (YIELD IN MAUNDS PER ACRE)

State	1951–52		Percentage	1952–53		Percentage
	Average Yield	Highest due to crop competition	Increase	Average Yield	Highest due to crop competotion	Increase
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bombay	7.01	72	927.0	8.19	—	—
Travancore Cochin	9.28	57	514.2	10.23	56	447.4
Uttar Pradesh	4.81	53	1,001.9	5.70	39	584.2
Hyderabad	7.60	64	742.1	6.64	66	894.0
Bihar	5.85	64	994.0	7.22	79	994.2
Mysore	12.80	60	368.7	7.24	71	880.7

Source :—(By courtesy of the Directorate of Economics and Statistics, Ministry of Food and Agriculture).

The source from which nitrogen or for the matter of that any other fertilizing constituent is drawn is immaterial. At Maruteru, green manuring, to supply 60 to 90 lb of nitrogen per acre, gave nearly 100 per cent increase over the control.[1] Experiments conducted at Berhampur (Madras) in 1935 showed that green manuring (Daincha) applied at 1000, 2000, 4000, 6000, 8000 and 10,000 lb leaf per acre gave grain of 1668, 1877, 1999, 2057, 2282 and 2299 lb per acre respectively.[2]

Economics of Manruing:—Whether or not our cultivator will be able to use these fertilizers in increasing quantities will depend on the economics of manuring. Fertilizers are considered costliest source of nitrogen, and yet it has been accepted that their use is highly profitable.[3] Experiments conducted by the Imperial Chemical Industries[4] in Bengal between 1936-39 show that the application of one maund of sulphate of ammonia gave an increase of 4.01 maund of grain and 9.45 maunds of straw. A dressing of 1½ maunds of sulphate of ammonia costing Rs. 7/4/- gave an increase of 6 maunds of grain and 14.18 maunds of straw.[5] At the then prevailing prices when paddy was valued at Rs.1/11/- per maund and straw at 8 annas a maund, the value of the increased yield worked out to Rs. 12/13, the net profit per acre being Rs. 5/9/- and the return of fertilizer expenditure 75 per cent. The percentage return on fertilizer expenditure would remain the same even under the present high prices, when there is an all round increase in prices.

Japanese Method of Rice Cultivation

A recent land mark in rice is the introduction of the Japanese method of rice cultivation which combines on a mass scale all the factors giving higher yields.

This method was tried in 1952-53 at the agricultural Research Station, Karjat

1. Agriculture and Animal Husbandry Research, *op. cit.*, p. 14.
2. Report of the Rice Research Station, Berhampur (Madras) for the year 1935-36, p. 48.
3. Yates, Finney and Pansey, *op. cit.*, pp. 10-12.
4. Quoted by Dr. Burns, *op. cit.*, pp. 52-53.

The Director of Land Records and Agriculture, Bengal also issued in 1950 the results of prolonged manurial experiments on paddy lands in the Burdwan Farm. Profit per acre worked out to Rs. 86/5/- with 100 maunds per acre of cowduug and Rs. 105/- with 3 maunds of bone meal and 30 seers saltpetre (John Kenny, 5. *op. cit.* p. 250.) Seems to be too high as compared with the results obtained in recent experiments.

and Government Agriculturat School, Kosbad. Appendix I gives details of the actual method. A few progressive farmers of Kora Gramodyoga Kendra also tried it in Bombay. Encouraged by the results, the scheme was launched in 18 paddy growing districts of Bombay on May 1, 1953. Mr. H. G. Patil,[1] Officer on Special Duty for Intensive Cultivation of paddy by the Japanese method, Bombay, himself *gives* the economics of the method as *detailed* in Table V

1. The Eastern Economist—June 4, 1954, p. 911, Japanese Method of Rice Cultivation in Bombay, H. G. Patil. *cf.*, Article on "Japanese Method of Rice Cultivation in Assam State by R. M. Tulsiani Rural India, April 1955, p. 147, in Lakhimpur District, Assam.

Table V

A COMPARATIVE STUDY OF THE COST OF CULTIVATION OF PADDY BY THE LOCAL METHOD TOGETHER WITH THE OUTTURN AND PROFIT PER ACRE IN BOMBAY STATE.

Name of the District.	Yield per acre in lb.			Percentage increases	Profit per acre in lbs.*		
	Local method.	Japanese method.	Difference.		Local method.	Japanese method.	Difference.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Thana	2544	3585	1041	40.92	234	369	135
Kolaba	3739	3692	-47	-1.26	315	428	113
Nasik	2210	4453	2243	101.49	318	425	107
Ahmednagar	2188	3462	1274	58.23	170	390	220
North Satara	1377	3206	1829	132.82	96	300	204
Ratnagiri	2762	3563	801	29.00	201	338	137
Surat	1802	3277	1475	81.85	156	293	137
Kaira	2947	3076	129	4.38	244	315	71
Panchmahals	2204	4119	1915	86.89	306	524	218
Broach	1694	3647	1953	115.29	135	395	260
Amhedabad	3667	4334	667	18.19	588	636	48
Baroda	2446	3866	1420	58.05	290	398	108
Poona	1807	3013	1206	66.74	164	265	101
Kolhapur	2153	3060	907	42.13	198	346	148
Dang	1516	2021	506	33.38	16	150	134
West Khandesh	441	2148	1707	387.07	55	230	175
Belgaum	2478	4445	1967	79 38	259	454	195
Karwar	2722	3687	965	35.45	209	271	62
Dharwar		4089	4089			307	307
East Khandesh		2807	2807			172	172
Grand total	39697	69550	29853	75.2	3954	7006	3052
Average for Bombay	2205	3477	1272	57.69	220	305	85

* Rounded to the nearest lb.

Note :—Figures under the local method for east Khandesh and Dharwar district are not available.
The average figures have been arrived at by taking the proformas of the district at randon.

Achievements:–Average increase in the yield per acre in Bombay was of the order of 57.7 percent. Much higher yields were obtained in other places. Madhya Pradesh got an additional yield of 38 maunds against its normal of 4 maunds per acre; Travancore Cochin 21.6 maunds against 10.5 maunds; West Bengal 19 against the normal of about 11 maunds[1].

1. Agricultural Situation in India—April, 1954, p. 15. Most of the other data in this section has been taken from the Abstract of Statistics, *op. cit.* and Agricultural Situation, August 55.

All India results for the year 1953–54 are all the more revealing. Out of a total area of 77.0 million acres under rice, only 4 lakh acres were brought under the complete Japanese method and 3 million acres under partial system. The total production, however, went up to 27.6 million tons against 22.5 million tons for the previous year, i. e., an increase of over 20 percent. Even if it is assumed that the 3 million acres under the partial system is equivalent to 1.5 million under the complete system, the total area under the Japanese method works out to 1.9 or a rounded figure of 2 million acres. When it is realised that the area under rice-74.2 million acres in the year 1952–53 was less by 2.8 million acres over 1953–54, it would mean that an area of 2.0 million acres under the Japanese method and 2.8 million acres additional area have given an additional production of 5.1 million tons.

The production from 2.8 million acres additional area at the rate of 902 lb per acre (the standard yield) would work out to a little over 1 million ton. The balance of the addition 4.1 or even 4.0 million tons can thus be attributable to the Japanese method. If some 5 lakh tons are taken as the contribution of favourable season and timely monsoons, the inescapable conclusion is that an area of 2.0 million acres (a little less than 3 percent of the total area) under the Japanese method has resulted in a net increase of 3.5 million tons (more than 11 percent) over the total yield.

The fall in rice production which was of the order of 3.3 million tons during 1954–55 should not raise any doubt about the success of the Japanese method. As much as 3.1 tons out of this shortfall was in the two States of Bihar and West Bengal where heavy rainfall and floods in the northern districts and continuous drought in the southern districts hampered the sowing and transplantation of both autumn and winter padday. The area[1] (a) under the Japanese method actually went up to 13.2 lakh acres in 1954–55 from 4 lakh acres in the previous year. Average yield in the areas under the Japanese method during the two years 1953–54 and 1954–55 was also 38½ and 35½ maunds per acre respectively against the All–India average of 8 or 9 maunds.[1] It would thus be seen that had it not been for the Japanese method, the total fall in rice production might have been much heavier.

All this is on the basis of the system already in practice. The Japanese have actually improved upon it themselves. Under their recently evolved 'Wave-shaped' rice cultivation method, higher yields of the order of 5,424 lb. with a spacing of $18'' \times 4''$ or even 10,134 lb. with $42'' \times 2''$ per acre have been obtained. The yield with a spacing or $30'' \times 2\frac{1}{2}''$ was 8,532 lb per acre. For a proper appreciation of the whole system it would be interesting to analyse the progress made in the various parts of the country. Table VI would highlight all this.

When our heroes-the krishi pandits-succeeded in beating the world records, it was pointed out by all and sundry that such results are impossible to obtain on a mass scale. The experience gained at the Experimental Research Stations, and the achievements under the Japanese method are sufficient to convince the worst critics that rice yields in the various parts of the country can be appreciably increased.

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1 (a) Agricultural Situation in India, May 1955, p. 122.

1. Dr. Deshmukh, Statement in the House of People, October 1, 1955.

2. Radio Broadcast Speech, Dr. Deshmukh, The Indian Express, January 11, 1955.

Table VI

PROGRESS OF JAPANESE METHOD 1953-54.

State	Total acreage ,000s.	Actual Average Yield. Local method. (Mds. per acre).	Actual Average Yield. Japanese method. (Mds. per acre).	Madium Yield Jap. Method Mds. per acre.	Estimated Addl. Prod. Jap. Method (in tons).	Estimated Addl. Yield per acre Mds.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
West Bengal	61.8	20	39	95*	43000	19.46
Assam	30.0			97½	5536	5.16
U. P.	35.1			80*	9600	7.66
Madhya Pradesh	1.5	20	58	117½	2110	40.46
Orissa	1.24	22	39	98	1004	22.64
Pepsu	3.7	22	30		1090	8.18
Madhya Bharat	15.3	16	32	96¼	10495	19.25
Trav. Cochin	1.1	43	65		942	22.24
Mysore	28.1	30	45	124½	15215	15.17
Rajasthan	2.0	25	60		1500	21.40
Bombay	4.6	31¼	42½	120	5654	34.77
Saurashtra	0.1	26	44	·77	51	15.03
Coorg	0.9			132½	427	12.81
Bihar	3.2	12	40		3204	28.21
Vindhya Pradesh	1.5	7½	17½	60½	540	10.40
Delhi	1.5	15	30	84	804	15.00
Hyderabad	152.0	18	36	145	78241	14.41
Tripura	0.05	16	25		18	10.08
Bilaspur	0.01	10.7	15		2	4.30
Bhopal	0.1	10	30		72	20.16
Himachal Pradesh	0.2	26¼	31⅜	64	23	4.00
Kutch	0.02	Not	Worked		14	19.60
Madras	13.8	34¼	48½	117½	6892	14.00
Punjab	38.3			96¼	8907	6.52
Andhra	5.9	44	53	97¼	1851	8.75
Total	401.7				197093 tons	
Average		22.4	39.0	100.2		15.99

Note :–The Japanese Method of Paddy cultivation was not adopted in the States of Ajmer, Manipur, Nicobar and Andaman Islands and J & K during the year 1953-54.

* Report published in the Indian Express dated February 22, 1954. The remaining data have been obtained by courtesy of the Ministry of Food and Agriculture.

It may be added that of all the food-grains paddy produces more food per acre than any other grain crop in India. Yields of 1000 to 1,500 lb. (700 to 1,000 lb. of ricc) per acre are not uncommon; 4,000 lb. or more has been obtained by suitable manuring with oil cakes and sulphate of ammonia. In India's most prolific region, the Ambasamu Oram district of the Tinevalley River, where two crops a year are grown, the record yield is 7,000 lb per acre for the first and 5,000 lb per acre for the second, making 12,000 lb per acre in all[1] An ordinary cultivator in Coorg manages to produce 1900 lb of paddy per acre, while a well managed estate produces about 3300 lb.[2]

Future Possibilities Of Applying the Japanese Method

The necessary inputs as recommended by the Indian Council of Agricultural

1. Sir E. J. Russell, World Population, *op cit.* p. 325.
2. Thirumalai, *op. cit.*, p. 90.

Research for in Japanese method are about 150 to 200 maunds of compost or cow dung, some 400 lb of fertilizer mixture of ammonium sulphate and superphophate mixed in the ratio of 2 and 1 [3] per acre and the necesssary labour needed at every phase of the operation,

As for the manures/fertilizers, its potential in India is more than sufficient to meet every need. [3a] There are enough raw materials in India to increase the inorganic fertilizer potential to any extent. If need be, imports can also be arranged from outside sources. [4]

As for labour, the peasant as well as the agricultural labour here in India has nothing to do for about six months in the year. [5]

May be that most of this vacant period is in the off season, but under the present conditions of unemployment and under-employment there should be no dearth of labour.

The Peasant, his Prejudice and Poverty

The only other consideration is the prejudice of the cultivator against the use of fertilizers and his povery. As for his bias against the use of fertilizers, the position has already changed and he has realised the imperative reed of fertilizers. The total yearly consumption of ammonium sulphate before the war was only of the order of 20 to 25 thousand tons and the share of foodgrains was practically nil.[1] According to the latest reports the consumption of fertilizers during the last 5 years has more than doubled and reached the peak figure of 5.5 lakh tons in 1954,[2] A major portion of this has gone to the small holdings of rice, wheat, sugarcane and tobacco.[3]

It may again be argued that our cultivator, poor as he is, may not be able to meet the initial expenses. In the purchase of fertilizers this difficulty can, however, be overcame by giving him the required quantities of fertilizers on loan and recovering the amount when the crop has been harvested. [1] Even this problem would be finally removed, when we realise that the yield will increase not only per acre but also per man, employed on the soil. His purchasing power will thus increase and he will be able to lay aside something for bringing about improvements in the land.

Total Potential

With the various indigenous factors being thus available in plenty, there is no possibility of any physical hindrance in our way for bringing large portion of rice area under the Japanese method. The total area under rice with an assured supply of water is of the order of 58 million acres. [1(a)] If we can bring 4 lakh acres under the improved method during

3. 'Fertilizers for Paddy' and 'You can Get Better Paddy Yields, the Japanese Way', both issued by the ICAR, 1954.

3(a) *Cf*,, Modern Review, Article on Water and Manurial Potential of India, by P. C. Bansil.

4. Dr. Deshmukh (Agriclture under the Five-Year Plan, Commerce Annual Number, 1954, p, A18 has already referred to the possibility of import of 1 lakh ton of ammonium sulphate to meet the increasing demand. The consumption of ammonium sulphate is increasing. It was 4·3 lakh tons in 1953 against 2.7 lakh tons in 1950.

5. "It has been estimated as a result of enquiries that the peasant in India remains unemployed to the extent of 45 percent and bullocks 70 percent of the total available time," (Mixed Farming as a Way to Success, Dr. M. B. Ghatge, Indian Farming, November 1940, p. 545).

1. Spate, *op, cit* p, 252.
2. The Indian Express, March 24, 1955.
3. The Hindustan Times, October 17, 1954.

1. The Central Government has already set apart a sum of Rs. 8 crores for the purpose. The original proposal which could not be implemented was the loan of one maund of ammonium sulphate against one maund of rice (Radio Broadcast of Dr. Panjabrao Deshmukh, The Indian Express, January 11, 1955).

1 (a), *Cf*, Article in the Modern Review, Water & Mumial Potential of India by P. C. Bansil.

the first year and 13.2 lakh acres in the very next year, there is every reason to believe that the tempo will go up in the succeeding years. The target for the year 1955–56 alone is 3.7 million acres.[2] It may not thus be difficult for us to bring undar the Japanese method some 20 to 25 million acres (including that under the partial method converted at 50 percent) within the next 10 years or say by the end of the Third Five-Year Plan in 1961-66.

The total additional production from just 2 million acres under the Japanese method of rice cultivation has been estimated by us at 11 percent over the existing production. The potential increase of rice as a result of 23 million acres under the new method would thus be of the order of 127 percent.[1] The extent of the total area that we may be able to bring under intensive cultivation may, however, depend on the demand for rice which is already growing.[2] With an assured market for rice at home or abroad, its potential may even go up further.

Our estimate may seem to be a little conservative when we find that China produces 33.3 million tons of rice from an area of 47.7 million acres and Japan 9 million tons from 7.6 million acres[3] as against India's 24 million tons from 74.0 million acres.

2. Dr. Panjabrao Deshmukh's Circular Letter No. XXI, Part VIII, pp. 145–46.

1. Incidently this tallies with the findings of Grist *(op. cit, p. 271)* who estimated that "improved methods might lead in the aggregate to the production from existing paddy areas of a total world crop of 200 million metric tons of rice, or roughly double the present outturn". India where the yields at present are the lowest will surely have possibilities of greater increase in the yield as compared with other countries of the world.

2. This is apparent from the need for price support policies for rice and the frantic efforts of Burma to dispose of their surplus rice, for which there is practically no demand.

3. Quoted by R. M. Tulsiani, Rural India, April, 1955, p. 145.

ROLE OF FODDER CROPS IN MAXIMISING FARM PRODUCE

By : **C. R. SHARMA**

WITH only 3.7 percent of the world's total land area, India has to support more than 20% of the world's human population and about 25% of the world's total bovine cattle population. Obviously, this is a gigantic task, and the country cannot afford to allow the standards of crop and animal husbandry to remain at the present levels without endangering its economy. The pressure on land has out-stripped the limits and, the underfed and under-nourished human and animal population is still on the increase. Animals though compete with human beings for their food and nutritional requirements, constitute an important link between the man and the plants. We depend upon them for the cheap motive power and the valuable products they supply while they also serve as a mechanism for increasing the soil fertility.

Hence there is a need for balancing the 'soil-plant-animal' relationship in such a way as to stabililize agricultural produc-

tion at a level of high economic returns and at the same time ensuring complementary benefits both from cattle and the crops. Such a system of farming is commonly known as 'diversified mixed farming'. The highly talked of grassland farming, cultivated pastures and ley farming methods cannot exactly fit into our conditions at large because the systems aptly suit the conditions in countries like U. S. A., Canada, Argentina, Australia, Newzealand and others as a matter of necessity ;—mainly on account of the facts that the average size of landholdings in them is large, secarcity of labour and not the scarcity of food prevails, rainfall is fairly distributed all over the year and the vast lands require protection from soil erosion and depletion. Nevertheless research findings of these countries in the fields of agriculture and animal husbandry have valuable place for application in our indigenous systems and practices of farming.

It is an accepted fact that the plants and vegetable products are the cheapest souces of human food because it is far more costly to raise animals then crops, and it requires comparatively much larger area of land to support an equal population of human beings through animal products than through the vegetable products. Our cropping schemes therefore should include not only cereals, pulses, cash crops and fibers but also fodders and vegetables.

Fodder crops yield rich feeds and forages for the livestock and maximize the economic returns by harmonizing the 'soil-plant-animal' relation to the best interests of the humanity. When suitably fitted into a planned rotation, the forage crop particularly if it is a legume does not actually substitute a cereal or cash crop, it rather serves as a pivotal crop which promotes the soil fertility and induces higher yields in the succeeding crops.

Quick and vigorous vegetative growth is a distinctive feature of the popular fodder crops. This also accounts for their remarkable response to nitrogenous fertilizers and organic manures. In fact all the chief merits and points of advantage attributed to fodders are resultant from this feature of quick growing habit. It is again this quality of a high degree of response to nitrogen in case of fodders which provides a clue to an overall increase in production of food, fibres and animal products.

In fodder crops a higher seed-rate is used with a view to secure a thick stand of closely spaced plants. This results into a considerable check on the weed-growth and the top layer of soil is, in due course of time, impregnated with a uniform mat of tender roots of fodder plants. As soon as the green fodder is cut and the plough worked, whole of this matted root-growth is turned under, thus adding a good quantity of organic matter to the soil.

This material after decomposition improves the soil in its mellowness, water holding capacity, final tilth and the available nutrient contents. Experiments have clearly shown that the nitrogen status of a soil can be stepped up gradually by growing of annual and perennial leguminous crops regularly. Enhanced activity of micro-organisms and improved availability of the mineral elements combined with better physical conditions of soil resulting from the increased organic matter contents, all contribute towards higher yields of the succeeding grain and cash crops. This method costs little but requires a tactful planning.

Green fodder crops occupy the land comparatively for a much shorter period than the grain or cash crops. Inclusion of fodders in a rotation therefore makes it convenient to increase the cropping

intensities without much difficulty. Moreover the longer the period for which a crop occupies a land the more adverse the effects on the soil structure and vice versa. So to say, the fodder crops do not impair the soil structure through compaction as much as the other crops like sugarcane, cotton, wheat, jowar or grain etc. may do.

With the exception of a few fodder crops like jowar, maize and sudangrass which may deplete the soil, most of the fodder crops, grasses and legumes are popular for their soil–conserving and soil–building qualities. The grasses and legumes can serve as effective cover crops for the protection of soil from erosion, apart from this when the cultivated leys and pastures are ploughed in they build up the organic matter contents of the soil. Whenever the soil shows signs of depletion and erosion it is desirable to put it under a 3 to 5 year's ley or a fenced cultivated pasture for some years rather than leave it as fallow.

Leguminous fodder crops are frequently used as green manure crops because they yield a high tonnage of green matter in a short period and decompose quickly after burying. In case of berseem, for example, after taking two or three cuttings it can be burried as a green manure for growing sugarcane or cotton after it. Similarly cowpeas can be turned into soil in the month of October after picking its ripe pods for seed, then wheat or oat can follow as a late rabi crop.

Manures, fertilizers and even micro–nutrients can be directly applied to a fodder crop or a green-manure crop for being subsequently available to an important cash crop which follows it. This ensures effective and more economic use of valuable fertilizers.

Under adequate irrigation facilities fodder crops serve as pivotal crops in the rotation as they provide for a more effective use of land, water, fertilizers and manures. By the virtue of higher intensity of cropping which is possible by including green fodders in the rotation, the farmer and his labour resources are more usefully employed all along the year.

Apart from the perennial grasses and legumes which help to economise labour and investment, there are crops like jowar and oats which can give two cuttings of fodder when sown early and adequately manured. In sub-mountainous areas and along the rivers and streams where soil is exposed to the danger of erosion, grasses like elephant grass, guinea grass, para grass, sudangrass, rhodes grass and 'Bansi' (Panicum antidotale) ; and legumes like Kudzu vines can be suitably established. Waste lands and uncultivated pastures can better be converted into cultivated pastures to serve as rich sources of green fodder for dairying and livestock breeding enterprises where necessary.

In short the fodder crops occupy a most vital place in the cropping system and farm economy of an Indian farmer. There is a great scope for improving the health and productive capacity of livestock in India and if any progress is to be made in this direction, our country must utilize the existing land resources to the fullest capacity for producing more of nutritive fodders and feeds, of course, this should in no way upset the national targets of food production. The practice of cereal–fallow rotation has now become out of date, because even under specialized farming and barani conditions, legumes must be given a place in the rotations. The general rule is to grow legumes and nonlegumes alternately. An intelligent farmer is expected to allow even higher frequency to leguminous crops in his rotations, the limit being reached at a level when the farm produce after

meeting all his essential requirements of farm, family, labour and livestock gives a reasonable surplus to meet the market requirements at suitable price on the margin, while the status of soil fertility is maintained high enough promising a good future produce of crops.

Most popular legumes are found amongst fodders, hence for maximizing the overall crop production the leguminous fodders are rotated best with non-leguminous cash crops and cereals, while non-leguminous forage crops and legume-nonlegume fodder mixtures can be alternated with leguminous and non-leguminous grain or cash crops respectively. For realizing full benefits from fodder crops, adequate use of appropriate fertilizers in accordance with the specific nature of crop, soil and climatic factors is of course necessary. Other crops in the rotation should also be manured with various fertilizers and bulky organic manures according to their responsiveness.

A practical farmer, should develop arable rotations which provide more fodder without decreasing output of food grains and cash crops Shorter rotations with legumes as pivotal crop should be practised thus lending sufficient flexibility in the choice of the grain or cash crop that is to follow the legume. Fodder crops, if properly scheduled in combination with green manure crops and other crops in general, can boost the farm production and step up the productivity of soil at the same time. The success of course depends upon the skill and resourcefulness of the farmer in organizing his farm resources and planning of cropping schemes.

CANE DEVELOPMENT PROBLEMS IN SUGAR INDUSTRY

By: **S. K. CHOPRA**

INTRODUCTION:—Sugar Industry is the second largest Industry in the Country. Its prosperity depends on adequate supplies of high quality cane. The factories, at present, are not getting mature cane with the result that India has a very low position in the Sugar World. The figures of cane and sugar yields per acre given below clearly show our backwardness in cane cultivation as compared to other sugar producing countries of the World.

Name of the country	Tons of cane per acre.	Recovery % of sugar.	Tons of sugar recorded per acre.
Cuba	17.12	12 25	2.095
Puretorico	24.16	12.23	2 956
Hawaii	62.05	10 46	6 489
Peru	41.14	12 33	5 076
Mauritius	19.63	12.08	2.370
South Africa	22.36	10 90	2.439
Java	56.20	11 49	6.440
Japan & Formosa	28.27	12 93	3 657
Australia	21.34	14 33	3 060
India	14.70	9.50	1.394

Statement showing the average Recovery of Sugar % cane in India :—

Year.	Sugar % cane.
1939–40	9 47
40–41	9.76
41–42	9.77
42–43	10 31
43–44	10 06
44–45	10 22
45–46	10 13
46–47	9.88
47–48	9.85
48–49	9 97
49–50	9.89
50 51	10.03
51–52	9.57
52–53	9.98
53 54	10 08
54–55	9 92
55-56	9 83

From the comparative study of the data as instituted above, it would appear

that All India average of Recovery is shocking. The situation has further deteriorated because between 1942–46 it is over 10% and the figure has declined below 10% afterwards, instead of registering a rise. It is disappointing to know that all the efforts and huge expenditure over so many years have failed to produce any laudable results and the situation has not improved even a little. So a thorough examination of the problem is required to bring improvements in this section of sugar industry.

However, the prospect of raising the yield of cane per acre is bright because in Intensive Development Areas the yield per acre has shot up to as high as 26 tons. The records obtained in the prize plot competition organised by the Deccan Sugar Technologists' Association in Bombay are really creditable. A record yield of 122.4 tons per acre has been obtained with the variety Co 419 being only a little short of the World Record of 129.1 long tons in Mexico with POJ. 2878.

Some aspects of Cane Development in the Sugar Industry with special reference to Eastern Districts of Uttar Pradesh are discussed below which, it is hoped, will go a long way in improving the cane yield as well as its Sucrose content.

1. Replacement of Old Varieties with Better Ones :—

During the last five years there has been hardly any change worth the name in the varietal position in the factory areas. This is a problem which is common to almost all these areas with a few exceptions, though in varying degrees and the progress so far made is far from satisfactory. The figures for the last five years of Baitalpur Sugar Factory reserved area are given below :—

Year	Percentage of approved varieties	Percentage of unapproved varieties	Ratoon
1952–53	49.9	49 1	1.0
53–54	44.7	52 3	3.0
54–55	45 0	47.0	8.0
55–56	47.9	44.4	7.7
56–57	45.4	41.9	12.7

It will thus be noticed that the varietal position has remained almost static. Percentage of area under approved varieties is still low. It needs re-orientation with the fresh set of circumstances.

The prime need for improving sugar recoveries is the introduction of suitable early varieties for crushing quite early in the season when the recoveries are surprisingly low. But this is a complicated problem. Early ripening varieties are usually thin and low yielding as compared with thick varieties. The grower is interested in high tonnage whereas the factory wants cane with rich sucrose content throughout the crushing period. Thick varieties are so popular with the growers and the yields are so good, that their partial replacement would require strenuous exertion on the part of field workers.

The introdution of early varieties is possible only if the factories decide to give liberal premium to the growers so as to make up the loss in yield. This subsidy can be given either on the cane supply or the cane acreage basis according to the prevailing conditions in the tract.

Now when we have increased area under early varieties then there is the problem of crushing the cane maturity wise. The cane varieties grown here are not intrinsically poor and it is also not as if we have reached anywhere near the potentialities on the sugarcane varieties. The main cause for low recoveries is that for the greater part we have been crushing immature cane. The improvement can be affected by crushing early canes in the early part of the season and the mid-season and late canes later in the season. So by adopting a varietal schedule of crushing both yields and sugar content the cane can be improved considerably and this is true both with plant and ratoon varieties. If maturity-

wise supply of cane is not possible due to one or the other reasons, it is still advisable to check the supply of late canes e.g., Co. 419 upto 15th January.

In Baitalpur factory area and also in the neighbouring factories Co 419 has taken a strong hold and it is a predominant cane variety. The cultivators cannot leave this variety because of its high yield and the factories are also deeply interested in this variety because high recoveries in the later part of the season are due to this variety only. It is a late maturing variety and gives good sugar recovery only after 15th February. It gives surprisingly low recovery in the months of November, December and January. So this variety is suitable for crush quite late in the season. In the year 1956-57 Co. 419 suffered badly from red-rot and wilt with the result that the recovery was reduced by 1.0 % from the previous year. So the preservation of this variety is very essential which requires clean cultivation and also the introduction of new seed of this variety from other areas. The cultivators are advised in their interest to grow three or four varieties with a combination of early and late ones so that the supplies ean be made maturity wise and the risk of growing one variety only is avoided.

Cos. 416 is an early maturing variety in the Eastern districts of Uttar Pradesh. If systematic efforts to encourage the cultivation of this variety are made and the factories are able to crush this variety only upto 11th January, the factory will show much better results and they are sure to register at least 1.0% improvement in sugar recoveries.

2. **Minor Irrigation Works :—**

Irrigation is the costliest item in the Eastern districts of Uttar Pradesh. A scheme for the construction of a net work of tubewells is under execution. This has surely helped the growers and the area under cane has definitely increased wherever facilities for irrigation water from tubewells exist. The following table will reveal the truth :—

Name of tube-well	Name of villages irrigated	Area under cane in acres 1955-56	1956-57	1957-58
Barwa	Barwa Basantpur	136.67	150.31	161.71
Sirwania	Sirwania Kanhaulia	106.51	153.50	181.22
Basbharia	Basbharia Mundera Rampur Khas	78.56	127.63	130.90
Banspar	Banspar Barari Mundera Mal	166.41	177.81	201.97
Baliawa	Baliawa Jaitpura	111.10	145.24	154.60

But these tubewells cannot serve the irrigation needs of all the sugarcane farmers. We will also have to tap the surface resources from the open wells by boring at the bottom. Greater facilities for the supply of oil engine sets on instalment purchase system will help the average cultivator immensely because the capital investment per unit is lower. Big growers can be induced to construct private tubewells by advancing them 75% of the total cost and realising the same in five yearly instalments.

Type 3 soils require irrigation badly and mere provision of adequate irrigation facilities will straight way increase yield by about 25 to 50% in such cane tracts. Sugarcane is raised on Bhat soils almost without any irrigation and if one or two irrigations are made available to the crop, the yield will be bumper.

3. **Construction of Pucca Roads**: The improvment of roads in cane areas for the transport of cane to the factory is one of the crying needs. It has been observ-

ed in our tract that when the rainfall is high, about 30%, the growers in the area are not able to bring their cane to the factory for 15 days at least in the beginning due to bad roads. The condition of feeder roads is still worse. No doubt the person most likely to benefit from good or at least tolerable roads is the cane grower who has to cart his cane but the factory is equally interested in it to get supply of fresh cane regularly. Some work has already been done but the pace of work should be accelerated.

Funds at the disposal of the Development Council are too meagre to construct and maintain the whole net work of roads and bridges etc. in the area. Government should come forward to take up the greater portion of the work in its own hands. Concrete Cement tracks should be laid out on main roads where the traffic is heavy. The factory, Development Council and the Government should co-operate and contribute in the buliding of good road system in the factory reserved areas.

4. **Seed Nurseries, Half Field Demonstrations and Zonal Trials etc.** :—Seed nurseries are maintained for the distribution of healthy seed of approved varieties. If the varieties to be grown in seed nurseries are well planned and the distribution of seed is properly organised, it is not difficult to achieve the desired varietal position in the area within 3 years. Seed nurseries also help in quick spread of new varieties when a well organised and a coordinated system for its multiplication and distribution exists. Again, its location is very important and it should be within easy reach of the growers.

Half field demonstrations are of various kinds e. g., Varietal Manurial, Entomological, cultural, Ratooning etc. The idea behind such demonstrations is to show to the growers on their fields the superiority of one operation over the other. But it is a pity that the cultivators do not know about the existance of a demonstration plot even though laid out quite near to their fields. There is no publicity of such demonstrations amongst the village folk. The very aim is defeated because the whole scheme is obscured by a mass of data and its practical application is nil. It is, therefore, proposed that a Village Committee should be formed and all the observation recorded should be discussed and made known to the growers.

Zonal Trials of varieties should be conducted at the factory farms only. This will avoid the leakage of varieties into the fields of the neighbouring cultivators. Moreover, the factory farms are well organised and they evince more interest in development and research work. The factory can also provide greater facilities for Laboratory analysis work.

5. **Cane Protection** :—Survey Reports about the incidence of pests and diseases are usually prepared by Kamdars and then passed on to the Cane Commissioner and Research Stations through proper channels. They are hardly reliable, firstly because Kamdar is not a qualified man to identify the disease and pest etc. and secondly he is over-burdened with his routine work and consequently sends false or wrong reports about the facts. There is, therefore, need of immediate expansion of Cane Protection Service and equipment. Appointment of one Biological Assistant with 2 Supervisors and 10 Kamdars in each Factory Area is essential, who can launch regularly cooperative compaigns aided by the Government and Development council for the control of pests and diseases. It will be their routine feature to conduct survey of pests and diseases and determine the intensity of attack in affected areas. Cane crop is greatly

damaged by a number of insects and pests and the grower is not unfamiliar with the damage the insects do to the crop. But he has yet to learn the advantages of control measures against insects, pests. This is the duty of the Biological staff to educate the growers and demonstrate to them the latest practical methods of crop protection.

I may also add here that before recommending any control measure, the cost of the operation should be kept in mind. Further, chemical control measures unless they are thoroughly effective, will not appeal to the cultivators on account of their poverty and illiteracy.

6. **Soil Extension Service:**—Very little attention has been paid to this subject. A need of basing crop planting and maximisation of cane yields on soil conditions have been completely ignored. Main Sugarcane Research Station, Shahjahanpur has conducted soil survey of various factory reserved areas during the last few years. The soils have been classified in these tracts and manurial experiments have also been laid out there for the purpose. It is very necessary to lay out permanent manurial trials for evolving standard manurial dose because even within a particular soil type there are numerous local differences that profoundly influence the growth and the manurial practices would have to be altered for these different conditions. One qualified Soil Extension Service Unit is required to be posted in each district to deal with such problems. To arrive at some definite conclusions a good number of experiments should be laid out under varying conditions otherwise the results will be misleading. Sufficient Govt. grant is also necessary to carry out Soil Survey Schemes for further development of cane zones.

7 **Publicity:**—The contact of the field staff with the growers is microscopic and they are never encouraged to inform themselves about the usefulness of the latest developments. The results of researches should take its practical application and it is necessary to translate them to the doors of cane growers by efficient means of publicity and demonstration. Publicity should be in the form in which growers can understand easily. Departmental leaflets should be sent in abundance for distribution amongst growers at Community meetings. It is encouraging for the growers to see high officials in their village meetings talking to them in their language. District Kisan Melas are also a good source of propaganda and they should be held at least twice a year and prizes of various competitions to be awarded in such Melas only.

8. **Field Staff :**—Launching a programme of intensive development of sugarcane requires sufficient field staff. Staff for sugarcane development which exists at present is totally inadequate to meet the requirements of the situation and it should be adequately strengthened. Kamdar is the pivot round which all the field activities revolve. This field staff is less qualified and low paid and consequently he adopts unfair means to supplement his income. Moreover, it is too much to expect from him, the vision, imagination and dynamism which are required. So his training at Cane Research Station is very essential. The attention of the Government is drawn to the above fact for ameliorating the state of affairs.

At present one Kamdar controls about 350 acres of cane, one Supervisor about 1200 acres, and one Inspector about 6,000 acres. They are overwhelmed with routine work and so more field staff is required for efficient working. The shortage of field staff is the chief obstacle in further development of cane zones.

Conclusion :—Various problems connected with the development of sugar industry has been discussed in the present paper. Now there is an apparant need for carrying on developmental work on organised and systematic way. Planning should be the basis of all activities and it should be vigorous and efficient at the lower level because it is this staff on whose shoulders the whole burden of the execution of the work rests. Thus, if considerable attention is given to Cane Development and with quality cane available to the mills, the recovery percentage of sugar would go up resulting in higher production.

IMPROVEMENT OF LIVESTOCK BREEDING IN YUGOSLAVIA

By : **A. CORRESPONDENT**

YUGOSLAVIA'S export trade has changed in structure since the war which was a result of the country's industrial development and its economic relations with a great number of foreign countries to which industrial products are exported. Nevertheless exports of cattle and cattle products always held an important position in the Yugoslav export trade, both in terms of value, and quantities. In 1956, exports of these produots accounted for about 11% of the total Yugoslav exports.

Owing to her geographical position, Yugoslavia has breeding trade. Besides, the policy of the country's national economy is to give full assistance to the development of cattle breeding by the construction of modern factories of cattle provender and modern slaughter house industries. The combined grazing of cattle on the pastures and feeding in stables, the feeding of sheep on pasture grounds, the fattening of hogs with combined feeds, have resulted in the meat having a good appearance and pleasant taste quite apart from other good properties. Yogoslav meat enjoys a very good reputation in many European countries as well as on the Near Eastern markets. For this reason, exports of live cattle, fresh meat and meat products represent a well established trade.

Yugoslavia has been exporting livestock, fresh meat and canned meat and allied products to the USSR, Western Germany, Eastern Germany, Italy, Austria, Switzerland, Holland, Belgium, France, Czechoslovakia, Greece, Syria, Lebanon, Israel, Saudi Arabia, Egypt, England and Malta. Reviewing the different products exported during 1956 toward Greece and the Adriatic sea ports ; that the Soviet Union mainly buys beef and pork, that Italy imports young "Siementhal" Cattle of the highest slaughtering quality, as well as their meat ; that England buys canned meat ; that Western Germany and Austria mainly purchase live cattle and live hogs for industrial processing in the slaughter house industry, and that Malta buys only uncastrated young bulls, etc., etc.

It is important to point out here, the market of Malta was largely supplied by imports from Yugoslavia. Although this is a market of small consumption capacity, Yugoslavia exports to Malta 6 to 7,000 heads of young bulls per annum. Owing to the quality, breed and age required by the Maltese market,

Yugoslavia has no serious competition there, and it may be safely expected that Malta will draw its supplies almost exclusively from Yugoslav imports.

Until two or three years ago, Yugoslavia was mainly exporting live cattle. During 1956, however, there has been a very marked rise in exports of meat and meat preserves, as may be seen from the following table.

Exports in 1956

Live cattle of all kinds and categories	32,000 tons
Beef	13,000 tons
Live hogs of Yorkshire and other breed	6,500 tons
Pork	4,000 tons
Live sheep and lambs	4,000 tons
Mutton and lamb	2,500 tons
Canned meat and meat products	6,200 tons
Horses for slaughtering	9,000 tons
working horses	1,000 tons
Various cheeses	1,500 tons
Total	79,700 tons

The present production capacities and the measures taken in Yugoslavia for the further development of the cattle breeding trade ensure that there will be no decline in exports of live cattle in spite of the sudden rise in exports of fresh meat and canned products.

In case of live cattle, sheep, lambs and hogs, there are all pre-requisites for a high quality output of export surpluses because breeding has been modernized especially on the agricultural farms and in cooperative organizations, where modern production methods are being introduced. In this respect, excellent results with white meat yielding hogs have been achieved at the "Belje" agricultural and industrial farm. Improved quality of production and lower production costs have been ac ieved here by mechanized feeding of hogs in their styes. Mechanized fodder handling and application of mechanized equipment for direct feeding have resulted in one worker being able to feed 1,000 hogs in one shift.

During 1956, the rise in exports was particularly marked in the case of fresh and canned meat. Until three years ago meat exports varied between 2 and 5,000 tons including beef, pork and mutton : this figure reached 19,500 tons in the past year. A similar rise also occured in canned meat exports. Exports jumped from 2,500 tons in 1955 to 6,200 tons in 1956.

This increase was made possible through the construction of a modern meat processing industry, of whic honly one part has been completed for the present. With the completion of all factories now under construction in the cattle breeding centres, fitted with modern equipment for the production of fresh and canned meat, Yugoslavia will be in a position to increase her exports several times.

For the present, the largest importer of Yugoslav canned meat and similar products is undoubtedly England. Thanks to the quality of her products, Yugoslavia has become a very large supplier of the London market and a noteworthy competitor of other exporting countries. Apart from England, Yugoslav canned meat is also bought by other European countries. During 1956, particular interest was shown by buyers in USSR to whom a first consignment of 850 tons has already been shipped. As the buyers were satisfied with the quality and packing it is to be expected that larger purchases will follow this year.

BOOK REVIEW

'RURAL DEVELOPMENT'

IN a publication entitled 'Rural Development' recently issued by the Agriculture Credit Department of the Reserve Bank of India, Prof. D. G. Karve has given a short account of his impressions in regard to the working of several types of institutions and services connected with economic development in the various continental and other countries which he visited in the course of his foreign tour during April-June 1956. Developments in different spheres such as co-operation, rural finance, agricultural economics, land reform, extension and planning, have been covered in the publication. In regard to co-operation, for example, Prof. Karve deals with problems relating to the size, management and operation of societies especially in the field of co-operative marketing and consumers' co-operation and indicates, with examples, how co-operatives in different countries have endeavoured to solve these problems. In another important section of his report Prof. Karve deals with the problems connected with agricultural finance as related to the requirements especially of the non-creditworthy and potentially creditworthy farmers. The experience of the United States, Canada and Denmark, in particular, is examined in this context and it is suggested that several features of our own plan for the development of rural finance derive support from such experience. Yet another aspect of rural development, viz. organised extension, is considered in some detail. Extension has an important place in the agricultural programmes of countries such as the United States and Japan. Prof. Karve deals with the different features of extension work in these and other countries and underlines the importance of technical improvement of agriculture through organised extension programmes in relatively underdeveloped countries. The publication also deals with other aspects of economic development, especially in the rural sector, and illustrates how experience elsewhere is of significance to countries such as India.

The publication is priced at Re. 1/- and copies may be had from the Accountant, Department of Research and Statistics, Reserve Bank of India, Post Box No. 1036, Bombay 1.

Notice

Increase in The Rate of Annual Subscription of 'Rural India' from Rs. 8/- to Rs. 10/- with effect from the 1st of November 1957.

'Rural India' made its first appearance in November 1938, now 19 years, with an annual subscription of Rs. 5/-. During War and thereafter, due to inflationary rise in the cost of living and abnormal increase in the prices of all commodities including paper, printing etc. the rate of annual subscription had to be increased to Rs. 8/- in 1948.

Of late, as a result of New Press Legislation and the incidence of heavy taxation, the cost of production of everything including the publication of 'Rural India' has risen very high. The management, therefore, is compelled to share this burden with a vast circle of its sympathetic subscribers and readers throughout India and abroad. We are sure, our kind subscribers and readers will be willing to loosen their purse string a bit more in the interest of continuity of this pioneering publication engaged in the service of developing rural life and conditions in this country for the last 19 years.

That being the obvious explanation, the rate of annual subscription of 'Rural India' will be increased from Rs. 8/- to 10/- with effect from the 1st of November 1957 which may please be noted by our subscribers and general public.

Manager

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